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ABSTRACT

Educational indicators are a subset of social indicators. They are consistently measurable, conceptually based, policy relevant, and related to the educational process. They can be used to compare educational units, monitor change, test goals, and predict the effects of policy changes. Use of educational indicators requires identification of the points at which external changes or decisions by policy makers will or can affect the situation under consideration and the degree to which the situation will be affected. Much of the data needed for developing educational indicators already exists, and should be gathered into accessible archives along with new data applicable at state, district, and individual-student levels. Making effective use of the indicators requires cooperation between educational researchers and policy makers. Several alternatives for structuring this cooperation are available, and should be combined in different ways for different situations. A permanent staff at the archives can assemble the relevant data, cast it into usable form, and disseminate it through the most effective channels. The cost of maintaining archives to serve a region of several states is estimated at $235,000 in 1980 dollars. Appendixes list data sources and include a lengthy annotated bibliography on social indicators, future studies, and policy analysis. (PGD)

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DESIGN OF A DATA BASE OF EDUCATIONAL INDICATORS FOR USE IN POLICY ANALYSIS

Final Report to the
Southeastern Regional Council for
Educational Improvement

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Under the terms of the contract letter addressed to Dr. Charles Law, Educational Director of the Southeastern Regional Council for Educational Improvement, dated February 14, 1980, the University of North Carolina at Chapel Hill assumed responsibility "to design a data base of educational indicators for use in policy analysis." This report constitutes our proposal for the design of such a data base together with cost estimates.

Throughout the report we employ the language of "educational indicators." It may be useful, therefore, to begin with an indication of what we mean by an educational indicator. For our purposes educational indicators are a subset of social indicators generally. In large part the so-called social indicator movement in American social science derived from the apparent success of the discipline of economics in attaching quantitative measures to the most important elements in economic behavior. For from coincidentally, one of the original leaders in the social indicator movement was Bertram Gross, a former executive secretary of the Council of Economic Advisers. Recognizing the advantages in economic policy-making and planning that accrued from agreement on the appropriate

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indicators of economic activity--even if not on their relationship and meaning--Gross sought to develop comparable social indicators that would permit the keeping of social accounts and measurement of a gross national social product.

For our purposes an educational indicator has several properties. First, it is measurable; it is not a guess or intuitive feeling about which there will be disagreement, but an agreed-upon numerical procedure that with sufficient effort will produce always the same result. Second, it is conceptually based; the indicator measures something that relates to a mental construct we consider conceptually important in the total process. Third, it is policy relevant; either by telling us the constraints on the possible or by informing us of the likely consequences of a choice between alternatives, it facilitates policy choice. And fourth, an educational indicator is, of course, related to the educational process.

Within these limits indicators can be used for various purposes. Indicators can be used to compare one educational unit with another, measuring which shows more and which shows less. Indicators can be used to monitor change through time, permitting us to locate where we are now against where we were. If we have sufficient confidence to establish our goals in quantifiable terms, indicators can be used to compare what is, with what should be, measuring shortfalls or demonstrating achievements. Finally, though most difficult, indicators can be used to predict, either through simple-minded extrapolation of trends or by the establishment of measurable interactions among variables to project future outcomes.

In the remainder of the report we will attempt: (1) to lay out some general principles that should be followed in the development of a data base of educational indicators; (2) to suggest a three-fold division of the organizational tasks involved; (3) to describe the data library component needed; (4) to propose and evaluate alternative ways to develop educational indicators in interaction with the policy-makers who will use them; (5) to recommend procedures for the dissemination of educational indicators to users; and (6) to estimate immediate and longer-run costs of operationalizing the system.

Principles of Design

In the design of the system that follows we have sought to follow five principles.

1. Indicators should be policy relevant. The primary focus of "a data base of educational indicators for use in policy analysis" should be upon choices with which policy makers must deal. In this respect it differs from a data base for use in research *per se*. Much research concerns relationships that are not within the control of policy makers. Indicators of such relationships are relevant to policy making only in so far as they establish the "givens" of the situations, the constraints within which policy alternatives truly exist. Such indicators should be included within the system when they measure conditions which may force a remedial policy response, e.g., population growth is largely beyond the control of educational policy-makers, but must be measured to project changing facility needs. The primary focus, however, in the development of policy-relevant educational indicators is the identification of a parsimonious set of measures of conditions which are subject to manipulation through policy decisions and which can be utilized, therefore, in making choices among educational policy alternatives.

2. Indicators must be intelligible to policy makers. We emphasize parsimony in the development of the set of indicators because they must be useful to decision-makers who cannot spend large amounts of time in reviewing multiple, perhaps contradictory, measures of conditions.

Even though derived from an extensive archive of data that does include multiple measures, the indicators reported should be few in number and--while they may be complex in calculation--expressed with a minimum of jargon. Such economic measures as "gross national product" and "cost-of-living index" provide prototypes; although their measurement is complex and derived in sophisticated fashion from multiple sources, in presentation they are simple and based upon common-sensible understandings.

3. Wherever possible, indicators should be derived from existing data sources. There are three reasons for this. In the first place such a procedure is cost effective; although data analysts often forget it, data gathering is expensive and remains so even if the costs are transferred to practitioners who are required to fill out the reports. Secondly, novel data sources will introduce errors until new procedures are standardized and widely understood by those who must supply the data. There is a third reason as well: if indicators can be defined and/or derived from existing data collections, it is possible to make retrospective measures of past events which permit both straight-line extrapolation as well as more complex time-series analyses and trend fitting. At minimum, without previous data points it is impossible to be certain that a current measurement reflects any change from past experience.

4. Wherever possible, indicators should be located within connected models of educational events. Some indicators in a single perspective are useful as observations simply because they warn us that something is going on. Wherever possible, however, we believe that the measurement of indicators should be placed within models of interconnected events. Industrial growth creates population migration which generates school enrollment while changing vocational needs and altering the availability of the labor pool of teachers as well as altering racial and social class

balances in the student populations and changing expectations as to school roles. Etc. Etc. Each of the words underlined marks another causal relationship within the model. It is an ambitious objective to seek to measure the critical interconnections of an educational system, so that through a series of transformations within the model we can predict future demands and future needs, but we believe such a goal should infuse the effort to select educational indicators for policy decision.

5. Wherever possible, indicators should be sensitive to the possibility of unexpected changes in the system. Having expressed the need for model-building in the fourth principle, we note the need for model-breaking, or at least, model reevaluation, in the fifth. The argument is paradoxical, but essential; it also is the principle most difficult to operationalize in practice. But the most serious deficiency of policy indicator systems developed in the past has been their static nature. Based upon prediction of the future from a sequence of past events, they assume—falsely--that the future will always be very like the past. Mathematicians have developed theory to cover the situation in which stable relationships between variables suddenly shift, or actually reverse; they call it "catastrophe theory." Social scientists are more familiar with the notion of a threshold value, beyond which relationships abruptly change. Such values are commonplace in educational policy-making, as in the form of a "tipping-point" in elementary/secondary school integration, or a "critical mass" of black students necessary to provide a secure base for retention of black students within a previously white university. Similar principles must be incorporated within an effective model. Failure to allow for such abrupt shifts in

relationships within models has contributed to the belief they are unrelated to reality and have little value in long-range futures planning.

In summary, we are proposing the development of an educational indicators system useful in the making of educational policy decisions at regional, state, and local levels. These indicators may be used: (1) to compare present educational operation with past educational operation and monitor change; (2) to compare present educational operations with those of other similar units and measure effectiveness; (3) to project likely future changes in the educational system that will be induced by external events; and (4) to estimate the future effects upon the educational system of choices made among education policy alternatives. As an incidental benefit such a system will permit: (5) projection of the impact upon the educational system of the region of choices made at the federal government level among policy alternatives.

Organizational Tasks

An example may be useful at this point to illustrate the application of the principle. One change in instructional technology of current interest is the introduction of the use of microcomputers. An indicator might be prepared measuring the extent of use of microcomputers in instruction. Although alternatives exist, it might constitute some measure of the proportion of time devoted to microcomputer-based instruction by students taking a particular subject. The selection of the appropriate indicator(s) might be made from any of a number of possible data sources, some existing and some requiring new data collection; if the latter they would become useful in measuring change only in the future. Whatever their source, the indicators of use would be presented in as direct a manner as possible as microcomputer use. Properly defined, the indicators would be capable both of replication and of technical criticism, but would be workable from the viewpoint of policy makers.

An indicator of microcomputer use would be of little interest by itself. It might hypothetically be related to level of attainment by students in the subject matter. Again indicators, now of attainment, could be defined, designated, implemented, and presented for both use and technical criticism. A more elaborate model would require attention to other variables: cost, time required to train teachers in use, effects upon student motivation other than those measurable by attainment, possible uses of teacher time freed by use of the technology, etc. These too could be reduced to indicators. Attention would necessarily be given to the possibility the relationships are not one-to-one or linear, and that beyond a point computer literacy explodes, builds upon itself, and multiplies its effectiveness.

The model of policy impacts resulting could then be used in either of two ways. It could be used passively to predict and witness effects. Under such circumstances state school officials could, for example, await the diffusion of microcomputer technology either by individual decisions within the local school districts or, alternatively, use the model to preduct the effects of a federally-sponsored program encouraging wider use of the new instructional technology. The use would be passive, however, in that it would be confined to anticipating effects upon attainment and identifying necessary responses, as in the need for teacher training.

Alternatively, the model could be used actively, to project the results of possible investment in microcomputer technology, to weigh the expenditure against alternative possibilities in the light of defined objectives, and to make a policy choice among program alternatives.

To state the sequence in more general terms, futures research using educational indicators is, in substance, nothing more than the projection of likely future events. In this sense, it represents an element that has always been present in effective planning. It is distinctive, however, in its conscious attention to two classes of future actions that may alter probabilities and projections: actions external to the decision-making system; and actions taken by the decision-makers themselves. Futures research is distinctive also in its willingness to conceive of the unusual--even the outlandish--in terms of new development or the reversal of past relationships.

In our construction of models to permit futures projections from educational indicators we refer to the points at which external events may affect probabilities as impact points; we refer to the points at which educational decisions taken in the future may themselves influence outcomes as choice points. By modelling the relationships between actions and outcomes, and by the utilization of a computer-based data system, it is possible to estimate the effects of such impact points and choice points upon the likelihood of specified outcomes. Our presentation will make use of one other term to be explained below: transformations.

The first stage in this process can be described very simply, although its operationalization may be extremely complex. If, for example, we are concerned with a very short-term future such as, for example, likely school enrollments in the coming year, we can seek to measure the school-age population within the relevant territorial unit, estimate likely out-migration, estimate likely-in-migration, and adjust for any likely changes in enrollment behavior, e.g., growth or decline in private school enrollments. The more distant the time period for which we wish to make projections the more uncertain, of course, are our estimates and the more problematic our predictions. Beyond a point in time we must make assumptions about likely future household decisions in respect to births, as well as increasingly difficult, because uncertain, assumptions as to population movements and the economic changes that underly them. Estimates will also be the more difficult the more they are specific; thus if we wish to project not only future enrollments but also to estimate their racial composition and the income level of the families from which the children will come, the data collection and data transformation tasks are enlarged.

Now, one way of dealing with such uncertainties is through the use of the impact points, the identification of the process-step at which external events may impinge upon the projections. Thus in the case of enrollment projections we can identify an impact point at which new births enter the enrollment potential. Such an impact point can then be used for any of several purposes. It can be used for continuous update of the growth projections by entering new units of information as they become available; or it can be used for the projection of alternative estimates at the uncertainty points to determine the sensitivity of the projections to the presumptions made. The United States Census Bureau, for example, makes population projections that include also a "high" estimate and a "low" estimate. Finally the impact points can be used to measure the sensitivity of the futures projected to the presumptions made about the relationships between variables.

At this point we introduce the term transformation to describe the presumed relationship between two variables. One weakness of complex models is the necessity of making assumptions about the transformations that will take place, e.g., the effect that economic growth will have upon population movement and then in turn upon school-age population. These transformations are based upon research into past interrelationships, e.g., previous experience with the translation of population growth into school enrollment. If, however, changes are taking place in these relationships, our estimates will be in error. By substituting alternative estimates of these relationships at the transformation points, a process sometimes described as "sensitivity testing," we can determine whether any significant changes occur in the predictions we consider to be of the most direct policy relevance.

Another example may provide a better illustration, however, of the complexity of the transformations within a chain of impact points. If, for example, we wish to estimate the availability of teacher candidates for possible employment in the school system at some future time, we must deal with a considerable sequence of individual actions: decisions to enroll in teacher-training programs; decisions to qualify under the competency certification qualifications imposed by the state; decisions to seek employment in the school system. If we are concerned with the future availability of experienced teachers we must also model the retention of individuals in school employment by estimating decisions to remain so employed. Estimates of future availability require also consideration of the future willingness of those who have been rebuffed from school employment (or who have chosen other career options) to abandon their alternative careers and seek school employment at a future time. And all these estimates are further complicated if we wish to take account of pools of teacher candidates with special skills, whether in music, in teaching pupils with learning disabilities, etc.

Each of these steps within the sequence can be measured from current data, but since the future availability of teachers qualified for employment depends upon a chain of individual decisions the impact of the earlier decisions in the sequence will not be felt for a period of time. Each decision step must be conceived of, therefore, as an impact point that can be affected by changes largely external to the educational system, such as an increased willingness to accept employment across state lines, changing social perceptions of the attractiveness of school employment, or economic events, most particularly a recession that might selectively affect categories of employees for whom teaching is an available alternative careers.

The example is designed for use also to illustrate the place of choice *points*. An obvious illustration of such a *choice point* is found in certification requirements. A decision to change the definition of competency to teach will change the size of the available employment pool and will likely alter also its social and racial complexion.

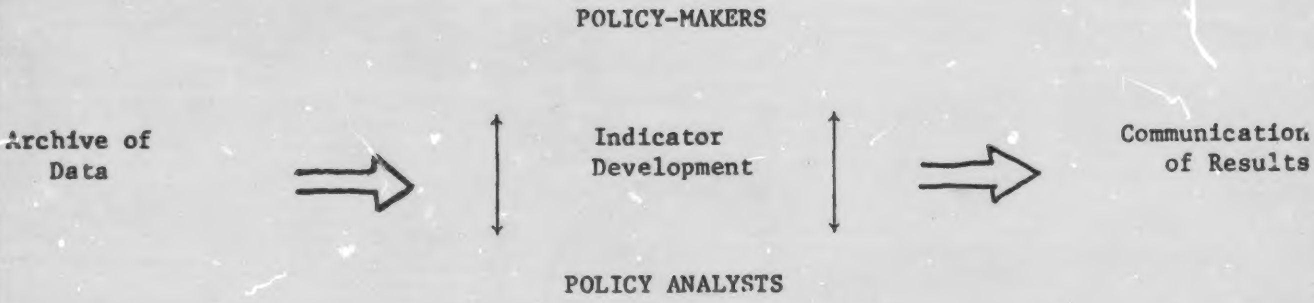
Choice points like these have immediate and tangible effects. Other choices may produce some of their effects in complex ways through feedback. Thus a choice made to visibly increase teachers' salaries should have immediate effects both upon retention of present teachers and upon the decision to seek teaching employment. Its impact upon the decision to enter teacher-training will be more long-term and will produce measurable effects only at a future date, though a date that can be estimated from the information system. Still longer-range consequences may include enhanced status for teachers among those who measure occupational prestige in monetary units, as well as negative feedback from those who consider teachers to be, in consequence, overpaid. Etc.

Similar *choice points* will be found in each educational indicator system. By their ability to predict the consequences of alternative decision-making scenarios, they provide the most immediately useful tool in the taking of education decisions. They are not, however, the only possible applications of an indicator system. At least two others can be identified.

First, decisions of the federal government that have relevance to education can be treated in either of two ways in such an indicator system: they may be treated as *impact points*, impacting upon the regional educational system, but outside the sphere of control of regional decusion-makers, or they may be treated as *choice points*. By projecting the impact of a given national government decision such as, for example, the adoption of a particular formula for the distribution of federal funds upon the region, the indicator system can provide regional and state decision makers with information useful to them in adopting policy positions. The Southern Growth Policies Board devotes a major part of its research efforts to research on just such questions, though not with a specific focus upon education. It is in this sense that the system of indicators developed will permit projection of the impact of choices made at the federal government level upon the educational systems of the region.

A second auxiliary use of the indicator system can also be noted: extrapolation of future trends requires a data base that describes past and current operations. Such data can also be used, therefore, to make comparisons either through time--the rate of change taking place--or comparisons through space--one state's performance and activity measured against others. The indicator system is intended to serve these multiple goals.

So far we have described the development of educational policy models in respect to their intellectual content. There is a second way by which we can break down the steps in the process, and one that is necessary when we turn to the organizational structure necessary to carry out the task. We see three steps in this process. The first of these is the creation of a data archive, containing either the data sets necessary for indicator development or information concerning their availability and access elsewhere. The second step is that of indicator development, a process requiring both the identification of user needs and the fitting of data into indicators and models that answer those needs. Because the identification of needs and the identification of acceptable solutions both require user input, we visualize this stage in the process as a two-way interaction between policy-makers and policy analysts. The third step is the provision of a network for effective communication of the results. The three steps are described in schematic form in Figure 1; each will be discussed in greater detail in the sections that follow.


POLICY-MAKERS
Archive of Data
Indicator Development
Communication of Results
POLICY ANALYSTS

SCHEMATIC MODEL: DEVELOPMENT OF EDUCATIONAL INDICATORS

Figure 1

The Data Archive

Standing alone, a library of data is passive and useless to policy-makers; but without the data a library can provide, policy-makers will be compelled to make decisions on hunches without facts and/or laboriously to collect new data that duplicate the old. We have already indicated the reasons for our conviction that existing data sources should be used wherever possible. We are convinced, therefore, that an archive of data and a library staff in effective, continuing intercommunication with those involved in indicator development are essential elements in the system.

A major part of our research effort was accordingly devoted to the compilation of an inventory of existing data sources concerning education and educational indicators. A great deal of information is collected in numeric form on education in the United States; criteria were adopted to reduce the amount of information to a more manageable level. First, that the data should be stored in a machine-readable medium, namely tape, and be generally available to other researchers. As well, the data should naturally include the states included in the Southeastern Regional Council; and finally, the source should be authoritative.

The methodology entailed contacting those individuals and agencies who are known to be vitally interested in education and educational indicators, and to inquire what data sources, subject to the above criteria, are available. A complete list of these agencies and the individuals contacted is provided in Appendix 1. These contacts include not only governmental and quasi-governmental sources, but also associations, e.g., the National Educational Associations, and private companies and research organizations, e.g., Stanford Research Institute, compiling and manipulating educational information.

The complete list of relevant data bases identified is provided in Appendix 2, and as one might expect, the most authoritative source of information dealing with education and educational indicators is the Federal Government, as represented by the National Center for Education Statistics (NCES) in Washington. In particular, in 1979 NCES published a document entitled: Directory of Federal Agency Data Tapes, that describes not only data tapes researched and compiled by NCES itself, but also by other Federal Government agencies such as the Office of Education, the Office of Civil Rights, the National Center for Health Statistics, the Bureau of the Census, and the National Archives and Records Service.

These data bases cover the entire range of educational indicators. For example, the Elementary-Secondary Education General Information Survey (ELSEGIS) series provides basic information at the school district level concerning revenues, expenditures, curricula, staff, and so on. As well, there are sources describing performance abilities, specifically those compiled by the National Assessment of Educational Progress and the National Longitudinal Study, data concerning the characteristics of high school drop-outs, the language skills of teachers, equal employment opportunities within the school systems, and so on.

An important set of data not cited in this NCES publication is the Merged Federal Files for the school years 1975-76 and 1976-77. In this instance, data from seven different federal surveys have been merged to form one comprehensive file for the universe of school districts. These files include: ELSEGIS; F-33: Survey of Local School Finance; OCR: Elementary and Secondary Civil Rights Survey; 437· State Administered Program; EEO-5; Elementary and Secondary Staff Information; NIE Special tabulations by school district; and, Equalized Property Value. There are 289 variables in the data base including revenue, expenditures, investment, enrollment, grants, and staff, and it is suggested that based upon more detailed analysis, these merged files may well form the core of the proposed data base. The Merged Federal File is available from NCES.

In addition to the National Center for Education Statistics, there is also an Office of Evaluation and Dissemination (OED) in the Department of Education. For the most part, OED is involved in one-time studies covering various topics of concern in the field of education. For example, the Sustaining Effects Study was undertaken to evaluate the nature, quality, and long-term effects of compensatory education over a period of several years. Unfortunately, the documentation for the projects themselves, much less the ensuing data tapes, is rather fragmentary. Unlike NCES, OED does not attempt routinely to make data generally available to the public, but will provide documentation and tapes upon request. It is therefore recommended that a continuing liaison be initiated with the OED researchers listed in Appendix 1 to determine the availability of these one-time studies.

In addition, data files archived in the Social Science Data Library of the Institute for Research in Social Science were searched for relevant studies on education and educational indicators. For example, the Gallup Opinion Index has published an annual survey entitled: "How Americans View the Public Schools" since 1969, which provides relevant information concerning attitudes towards the educational system and reactions to various social programs and policies. These studies are also listed in Appendix 2.

We do not claim that the data tapes outlined constitute an exhaustive list of data tapes that may be of interest to the Southeast Regional Council. In particular, no effort has been made as yet to canvass the member states in respect to their own individual data holdings, a task that should be undertaken during the coming year. This list is, however, intended to provide an overview of the tapes generally available, major sources, and the depth with which educational issues are being studied. At this point it is apparent that the major sources of data tapes are four: the U.S. Bureau of the Census; the

National Center for Education Statistics and the Office of Evaluation and Dissemination, both in the U.S. Department of Education; and the National Assessment of Educational Progress in Denver, Colorado. Depending upon the subject areas identified for indicator development, other sources of data will increase in relevance. If rising energy costs are a major concern, the data collections of the U.S. Department of Energy, available regionally through the Oak Ridge National Laboratory and the Oak Ridge Associated Universities, will be of great value. Projections of regional industrial and population growth, prepared both by the Southern Growth Policies Board and by the Oak Ridge National Laboratory, draw upon other sets of economic data, which can be accessed either indirectly through these organizations or directly. The extensive data holdings of the National Science Foundation, while most relevant to higher education policy, contain materials of interest in appraising science education generally. Data from the Law Enforcement Assistance Administration and the National Institute of Justice will be valuable in the study of juvenile crime and school vandalism and so on.

After conducting this inventory of data and of educational indicators already available we have defined three sets of indicator types based upon the data base employed, the model of interaction posited, and the group of policymakers to be served. We propose that these three sets of data holdings be the major elements in the design of the Data Archive.

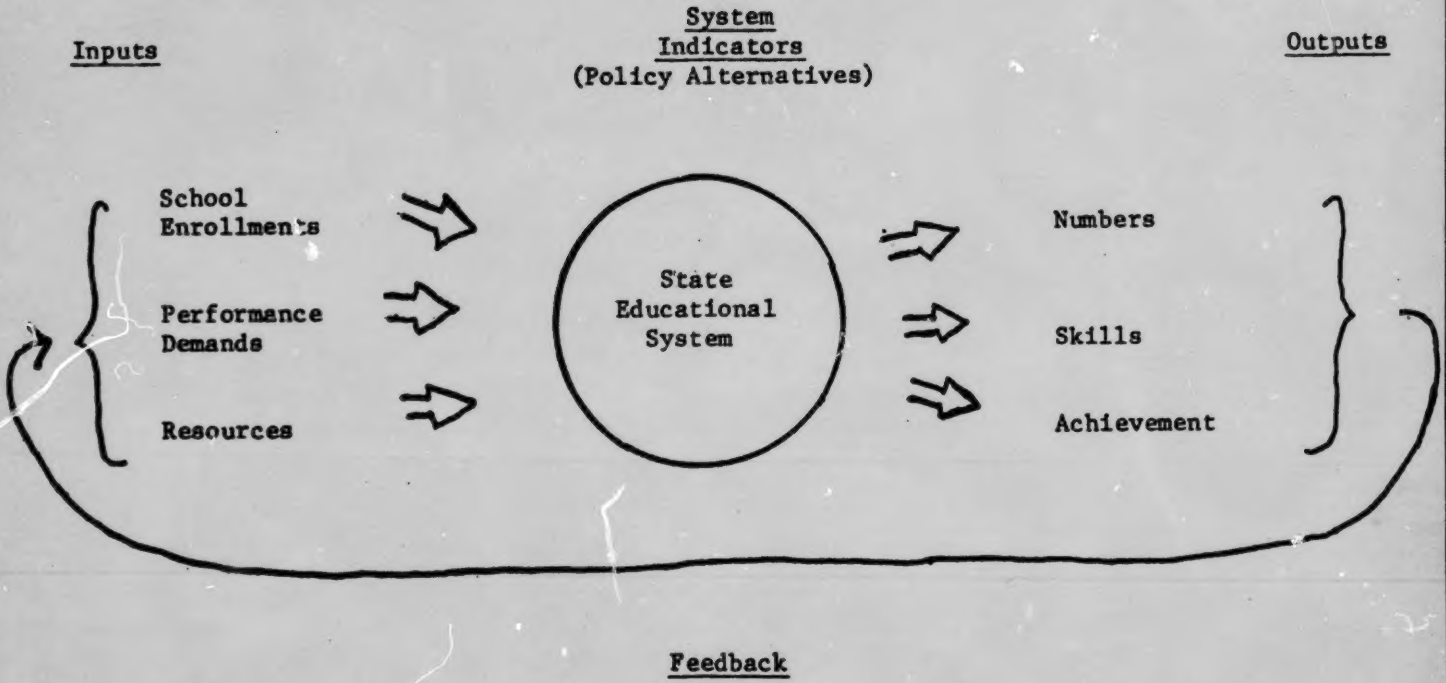
1. State Educational System Indicators. The first set of indicators will be derived from data sets describing educational activity at the state government level and will be conceptualized via a system model. The unit of analysis is the state. Inputs into the educational system at the state level include school enrollments (including changes in the social composition and territorial distribution of enrollments), performance demands upon the school system from both mass publics and elites, and resources measured both in dollar

terms and in the personnel services and non-personnel goods they buy. System indicators measure the alternative responses to demands and alternative uses of resources that are made, or that can be imagined and modelled; these represent the policy alternatives of interest to the decision-maker. The outputs of the system reflect the numbers, achievement levels, and particular skills of students produced through the system; in higher education they include also the intellectual capital produced through academic research; at all levels of education they include the social contribution made by teachers and other school employees apart from their direct instructional role. Within the system feedback mechanisms describe the measurable impacts that can be traced from outputs to changing inputs, whether in terms of demands or--for example, in a state where education is making an effective contribution to industrial development--upon both demands and resources. The State Educational Indicator System is outlined in Figure ?.

Much of the data to operationalize such a model is already available, primarily from federal governmental sources. General dimensions of state system activity can be found in the several data tapes summarizing state-by-state data from the Statistical Abstract, the Book of the States, etc. Specifically educational data will be found in NCES tapes. Broader aspects of state socio-economic and political characteristics are measured in entries in such Inter-University Consortium on Political and Social Research files as: Partisan Division of American State Governments; Economic Development and State Policy Data for the United States; Socio-Economic, Public Policy, and Political Data for the United States; American State Data; and Diffusion of Public Policy Innovation Among the American States; and in the Weber-Munger State Policy File. The principal data elements that are missing from the model are comparable state-by-state reports of public attitudes toward education (demands), levels of teacher competence, and achievement and ability measures for enrolled students. Simulation methods could be used

Potential Uses: Federal Program Projections; Interstate Comparisons; State System Model-Building

Potential Users: Regional and State Educational Policy-Makers


Inputs
System Indicators
(Policy Alternatives)
Outputs
School Enrollments
Performance Demands
Resources
State Educational System
Numbers
Skills
Achievement
Feedback

STATE EDUCATIONAL INDICATOR SYSTEM

Figure 2

to create state data values, but the limitations of such an approach are discussed below in relation to the third indicator system, comprising individual-level data.

As anyone who has had responsibility for the preparation of state reports fed into these data systems is well aware, the quality of these data sets vary widely. Partly this is inevitable. Although national standards are established to achieve report comparability, they are only imperfectly followed at the level of the individual state. Nor can any national reporting system capture all the uniqueness of the individual state; idiosyncrasies must be blurred. Put differently, any state will have access to better data about itself than the national data sets provide. But for purposes of comparison, or for the incorporation of multi-state data into model-building, this is the best quality data that is available and the data that should be archived.

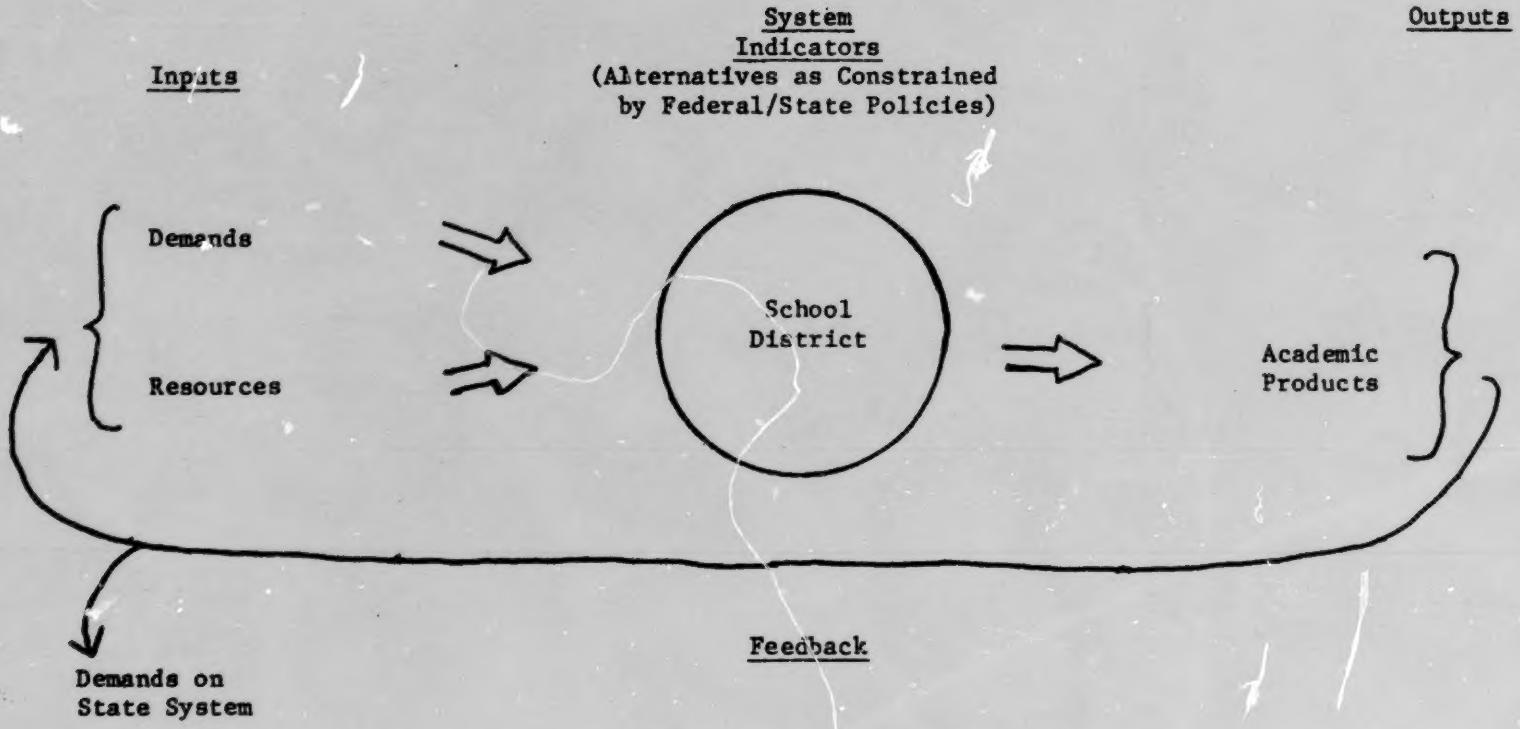
As this suggests, the principal uses that are foreseen for this section of the archive are comparison and state system model-building. We assume that the primary users will be persons interested in educational policy-making at state level and persons interested in educational policy for the region (again, in practice, primarily state policy-makers). State policy-makers will be able to use the data to compare their own state experience with the experience of other states they regard as comparable; they will be able to use models developed from the system to project the likely consequences of their own policy choices and of the actions of others; they may find it a convenient place to find historical data on their own state to compare with present experience. Regional policy-makers will find the system valuable in its capability to project the impacts of pending federal educational decisions upon the states within the region. We assume that the frame of reference most often selected in identifying states as comparable is the region; for the same reason regional models will often seem most appropriate in the projection of likely futures. We recommend, therefore, that special attention be devoted to the development of a subset of state-level data for the southeastern states that may be more extensive than that for the nation as a whole.

2. School District System Indicators. A second set of indicators, similarly conceptualized in a systems model, should focus upon the individual school district as the unit of analysis. The model employed is essentially similar to the state system model, though more specific. Inputs include both demands and resources. State (and national) policies constrain the range of policy options available at the system level for the individual school district but variations obviously do exist in the way that resources are employed. Finally, the outputs produced in terms of academic products generate feedback within the system. Linkage between this system and the state system can be provided by broadening feedback to include district-generated demands for changes in state educational policies just as a state-level model can be expanded to national scope through the incorporation of feedback to the national educational policy-making system; the latter system is, however, beyond the scope of the project. Figure 3 describes the school district indicator system.

Data presently available and appropriate for operationalization of the system has already been discussed above. The core of the data base available from national sources is the Merged Federal File, containing entries on expenditures, investment, enrollment, staff, and other topics. These data can be supplemented with other data from national sources, many of which are described in Appendix 2. Following the 1970 census a special tabulation was prepared by the Census Bureau, allocating data to school district areas. Although publication plans have not yet been announced, it is probable a similar tabulation will be

Potential Uses: Interstate Comparisons; District System Model-Building

Potential Users: State and School District Educational Policy-Makers


System Indicators
(Alternatives as Constrained by Federal/State Policies)
Inputs
Outputs
Demands
Resources
School District
Academic Products
Feedback
Demands on State System

SCHOOL DISTRICT INDICATOR SYSTEM

Figure 3

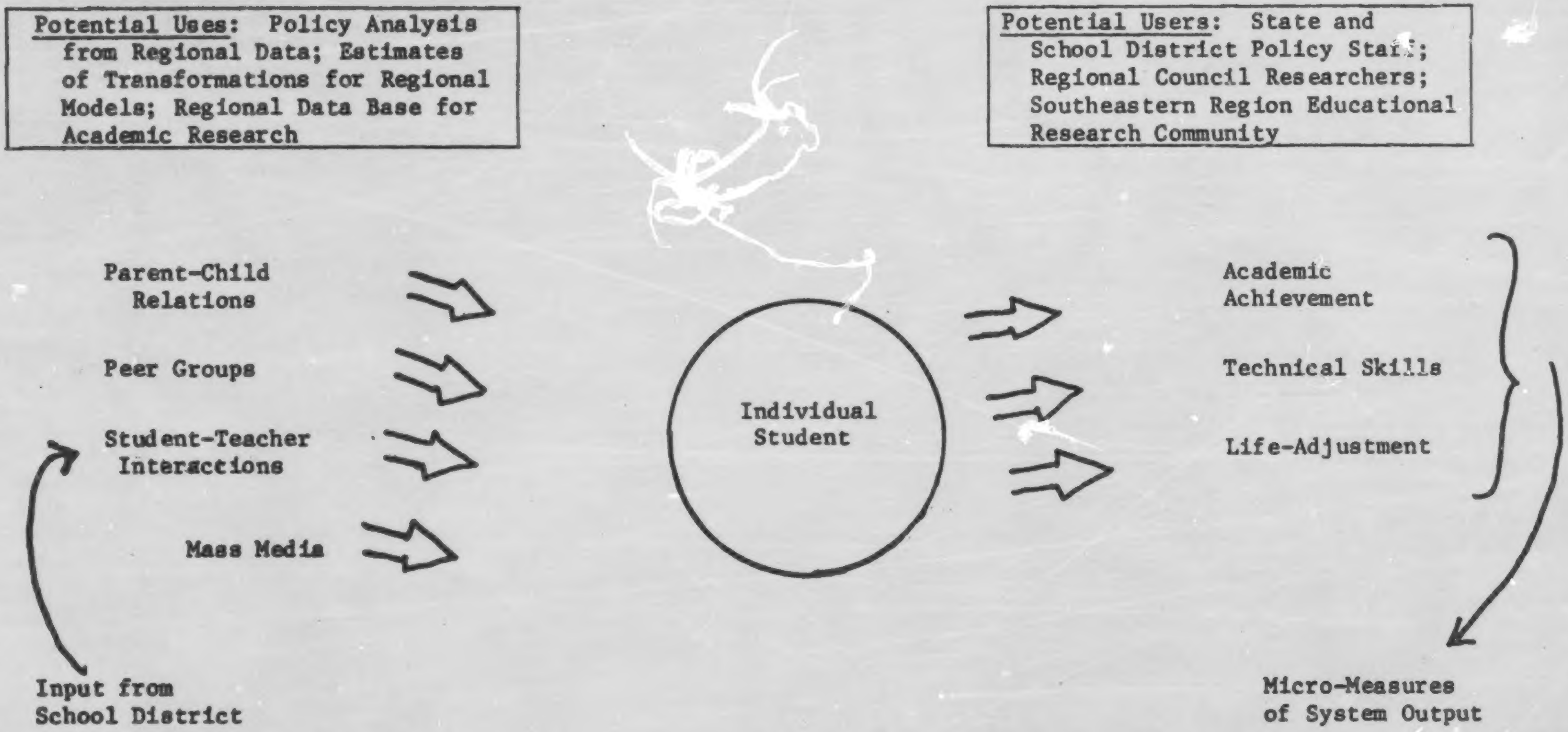
published from the 1980 census. Such data tapes should be added to the archive. Since some data sets are available on a county but not on a school district basis, including certain census files, some economic data, data on juvenile detention centers from LEAA, etc., it is possible that a supplemental file should be prepared, using the county as the unit of analysis. Such a county file could incorporate and extend the county data base developed by the Southern Growth Policies Board. For school districts coterminous with county boundaries and for school districts that can be combined to form county units, such a supplemental file could perform many of the same functions.

The comments made above, however, concerning the quality of state-level data must be repeated here *a fortiori*. One of the most intractable tasks faced by the National Center for Educational Statistics has been the creation and implementation of a common reporting scheme for school district data. The effort to achieve national uniformity in report categories runs contrary to local accounting practices, varying state legal requirements, and long-established habit. Not all local district data obtained from national sources is vulnerable to these problems. School district data from the national census is the highest quality data available. Similarly, energy use data from the U.S. Department of Energy, whatever its imperfections, is as good as can be found. But for any given state the state's own data system is likely to provide better information on the local school districts because it is tailored to the peculiarities of the state's fiscal structure. For this reason the data archive should maintain close liaison with state educational policy-making centers.

This conclusion is related in turn to the assumptions made as to the likely use of this indicator system. Although data from the school district indicator system could be used for model-building using a national universe of school districts, it is probable that most uses of this data base will be state-specific. The most likely users will be state educational policy-makers who wish to monitor change at school district level, to discern the territorial distribution of need, and to employ the conclusions reached from state-specific models of school district behavior. A secondary use of this data base may be at the district policy-making level where it can be employed to monitor change through time, to compare experience with that of other districts, and to predict futures from a district-based model. Both for comparison, however, and for model-building, the experience of other districts within the same state is likely to seem the most relevant. Although there will be exceptions to this generalization--both state and district policy-makers may wish to compare rural districts with rural districts, or big-city districts with big-city districts, disregarding state lines--it points to the desirability of maintaining state-specific subsets of district data within the overall data base.

3. Individual Learning Achievement Indicators. The third set of indicators will utilize individual-level data and focus upon the individual student as the unit of analysis, perceived within networks of interpersonal and media-mediated interactions. These interactions include parent-child relationships, peer group, student-teacher interactions, and the stimuli of television and other leisure-time activities. The model that defines the selection of variables as suitable indicators for inclusion is a learning model, with learning defined as including both academic and technical components as well as life-adjustment skills. Linkage to the school district indicator system is provided at the point of student-teacher interaction, and the achieved learning of individual skills is a micro-measurement of the macro-output of the system, although simultaneously a reminder that individual learning is affected by many influences outside formal education. This element of the data system is visualized in Figure 4.

Ideally the linkage between individual learning and school district functioning would be completed by data files for individuals that were identifiable by school district. Less ideally, but desirably, data files for individuals


Potential Uses: Policy Analysis from Regional Data; Estimates of Transformations for Regional Models; Regional Data Base for Academic Research
Potential Users: State and School District Policy Staff; Regional Council Researchers; Southeastern Region Educational Research Community
Parent-Child Relations
Peer Groups
Student-Teacher Interactions
Mass Media
Individual Student
Academic Achievement
Technical Skills
Life-Adjustment
Input from School District
Micro-Measures of System Output

INDIVIDUAL LEARNING ACHIEVEMENT INDICATOR SYSTEM

Figure 4

should be identifiable by state and capable of linkage to state system behavior. Unfortunately, most data sets that provide information on individual behavior are based on samples that were too small to permit state identification, or reflect deliberate decisions to avoid state specificity.

As an alternative we recommend the creation of a region-specific data base. Where data sets exist incorporating aspects of the individual learning achievement system that do identify the region within which the respondent was located, we recommend that they be acquired and subsetted to provide a regional data base for the South. Since most (though not all) national data sets of relevent individual-level data contain regional identifiers and can be so disaggregated, the individual learning achievement indicator system so created would itself be a subset of a comparable national indicator system.

We see three advantages in such a strategy, two primary and one secondary. First, it would provide educational policy-makers in the South with conclusions in regard to relationships in which they could have greater confidence, recognizing the continuing uniqueness of the region. Second, it would permit the transformations--returning to the terminology earlier proposed--in model-building to be based on regional rather than less relevant national relationships. Third, though less directly tied to the primary objectives of the Regional Council, by providing a convenient regional data base to scholars in the area, it would encourage a regional educational scholarship of substantial, if indirect, benefit to educational policy-makers.

The first candidates for inclusion in such a data base would be the National Assessments of Education, conducted since 1970-71 in a wide variety of fields, including art, career and occupational development, citizenship, literature, mathematics, music, reading, science, social studies, and writing. Using a highly detailed probability sample, the National Assessment includes respondents in the 9-year, 13-year, and 17-year categories, as well as young adults 26-35.

Data are regionally identifiable. The selection of specific tapes in subject-matter areas would depend, presumably, upon the definition of priorities for indicator development.

The National Longitudinal Study, also identifiable by region, provides a major source of data for linking school achievement with life success. Other studies permitting the linkage of level of education with economic outcomes include the National Longitudinal Surveys of Labor Market Experience (Parnes Data), the Youth in Transition project of the Institute for Social Research, and the Quality of Employment Surveys conducted by the same organization. The Panel Study of Income Dynamics, a national sample of families reinterviewed annually since 1968, provides individual data linked to contextual variables that include local public school expenditures and labor market opportunities. Americans View Their Mental Health, an earlier study recently replicated by ISR, permits analysis of change in the relationship between education and successful life adjustment.

Data on public attitudes toward education and educational issues--one measure of demands upon the system--are ordinarily coded by region also and suitable for regional use. Unfortunately, the series of surveys, How Americans View the Public Schools, conducted by the Gallup Organization annually since 1969, has not as yet been released for research use. But a number of mass surveys conducted by Louis Harris and Associates--some, though not all, of which are listed in Appendix 2.--are available. The Annual Housing Surveys contain a series c questions concerning satisfaction with the provision of local governmental services, including education. Though identifiable only to regional level they permit analysis for the South as a unit of relationships between satisfaction with the public schools and other variables.

A number of studies, many of which are available from the Inter-University Consortium on Political and Social Research, permit identification of relationships immediately surrounding the student in the school. The Student-Parent Socialization Study, though dated (1965), surveyed a national sample of high school seniors and their parents on attitudes toward school, family, and the future. Complementary studies were conducted of Political Roles of Social Studies Teachers and Principals and of School Board and School Superintendents. The Political Participation in America study, conducted by the National Opinion Research Corporation, provides data on political participation at both national and local levels, including school affairs, and the General Social Surveys, conducted annually since 1972 by the same organization, measure attitudes on the family, social stratification, and education among other topics, with questions deliberately chosen to replicate earlier studies and permit trend line measurement. All these studies are coded to indicate region, as are the National Surveys of Youth, measuring the frequency and seriousness of delinquent activity among adolescents, aged 13 to 16.

Finally, reference in this necessarily incomplete list should be made to several special surveys of the U.S. Bureau of Census, which do provide state estimates, but cannot be disaggregated to county or school district level due to their sample size. These would include the 1976 Survey of Income and Education, the Current Population Surveys (matched to longitudinal regards of social security earnings in 1973 and 1976), and the 1960 and 1970 Public Use Sample of the U.S. Census, which provide a sample of individual-level records for those years. A similar publication will result from the 1980 census.

As indicated above we anticipate that the use of the part of the data archive will be threefold. First, data will be used by staff of state (and local) policy-makers to determine from regionally appropriate data the relationships between variables of policy interest. Second, data will be used by members of the Regional Council staff and contractors to the Council to provide regional values for the relationships between variables (transformationa) incorporated in regional models. Third, data will be used by members of the academic community interested in educational research and convenient access to these data will encourage the development of a regional focus in educational research.

In all three uses caution must be exercised to assure that similar research has not already been completed, using the same data source. Misapplication of research effort through duplication is a problem in all research design, but such problems are particularly severe in the secondary analysis of a common data sources. The surest guarantee against such wasted research effort is regular use of interactive, computerized bibliographic searches of the relevant literature in advance of any research initiative. Fortunately, through the use of keywords to describe the area of research to be scanned, and through access to an on-line bibliographic archive such as DIALOG, BRS, or SDC, such bibliographic searches can be readily executed. All three provide access to the principal relevant bibliographic file which is, of course, ERIC, an educational documents directory. Interconnection with one of the three systems should be provided through the Data Archive.

Some reference should be made to one other possible use of the individual data contained in the third segment of the archive. As noted above, several elements of data we would like to have in modelling the operations of state educational systems and school district systems are unavailable, most particularly data on the attitudes of the publics served (demands), and cross-state comparable data on student achievement. Also as noted above, such data values could be generated by use of a simulation approach.

The procedure, while often complex to execute, is simple enough in principle. Applied to states, it amounts to the proposition that variation among states is based not upon any uniqueness of the state as such, but simply upon the fact that each state is a particular mixture of population types. We know, for example, that attitudes toward educational policy differ between city people and country people, between rich and less-rich, between blacks and whites, between young and old, among Protestants, Jews and Catholics, etc. Since each state is a distinctive set of these population types we create estimates of the attitudes of its population by appropriate weighting of the national or regional values for the population types. Put succinctly, we assume that Alabama differs from Mississippi only in that a larger proportion of its population lives in cities, a smaller proportion is black, etc.

One of the most striking--and successful--uses of a simulation approach to estimation of state attitudes is found in the so-called MIT Simulmatics project, originally conceived as an effort to give practical campaign advice to 1960 presidential candidate John F. Kennedy. The Department of Energy makes heavy use of simulation techniques to generate estimates and the Energy Atlas prepared for DOE by the Brookhaven National Laboratory contains county-by-county data on energy production and consumption that is in almost all cases created by simulation techniques.

The individual-level data in the regional file we propose could similarly be used to "fill in" estimates for missing data in the systems files. We are on the whole skeptical of such a procedure. We are doubtful that states in their public attitudes toward the educational process are unaffected by variation in educational program. So far as achievement scores are concerned, use of simulation from regional data assumes away what we are usually seeking to test, i.e., whether differences in state programs make any differences in state achievement apart from the variations we know result from family background, educational level of parents, etc. There may be, however, instances in which simulations from individual data to state estimates appear justified.

A final comment ought to be made in regard to data dissemination. We h written so far in the singular, referring to one Data Archive. This langugage reflects our belief that the development of computer networks makes less and less sensible the duplication of data files at separate locations that has been characteristic of the past. Remote terminal access to a single data archive is readily achieved, and data may be duplicated and/or analyzed from any unit that is allowed access. Central archive operation is particularly advantageous when use of data files, e.g., the hierarchical files of the census and some other public data, requires software that may be expensive to duplicate and requires special expertise to maintain.

On the other hand, if a particular data file is in heavy use at a remote location it may be cost effective to duplicate the file and save the transmission costs of interconnection. The problem is not a substantial one at thepplanning stage, however. The technology to either (a) duplicate tapes and ship them; or (b) to provide remote terminal access to a central file, is readily available. Subsequent choices between these modes of operation can be made in terms of what is cost-effective at the time.

Indicator Development

In the previous section we have described what we consider to be an essential unit in the development and design of an indicator system for education in the southeastern states. In this section we define and describe an essential process that may or may not be located within a unit. In fact there are a number of alternative ways in which this process can be structured, procedures which are not mutually exclusive. In this section we will try to identify and evaluate them.

The process itself is, however, an essential one: an interaction between policy-makers and researchers in the definition and creation of educational indicators. There are alternatives to interaction that might be visualized;

they serve only to emphasize its necessity. One alternative is to leave the task entirely to researchers. Some kind of academic unit might produce an inventory of every imaginable measure (indicator) of the educational system, select those that seemed most important, and implement them. There are two difficulties: first, that the task is immeasurably immense; second, that few if any of the indicators would find their way into use in policy-making. The second extreme alternative would leave the selection and definition of indicators entirely to the policy-makers themselves. But this describes not a solution, but the problem; the policy-makers are too busy making decisions to research in detail the alternatives to their choices. This is the principle of parsimony with which we began. If asked to undertake the task personally, they will have to assign responsibility to their staffs which is, in fact, one of the alternative solutions. The problem defined is, however, to find the most suitable process of interaction to bring together the skills of educational researchers with the needs of educational policy-makers.

In the context of the Southeastern Regional Council we see six alternative mechanisms for structuring this process. Each has its advantages, each its disadvantages. Fortunately, it is unnecessary to select some one among them as the best. They are complementary, and a mixture can be employed to best effect. Figure 5 defines the six process approaches, with brief statements of their merits and demerits. They are: (1) a reliance on capacity-building within the state educational agencies to make each self-reliant in policy research; (2) creation of mechanisms for networking among the state educational agencies to permit the sharing of skills and expertise; (3) establishment of a central staff within the Regional Council that will be capable of bringing together researchers and policymakers, and applying skills in research to the effective solution of practical policy problems; (4) creation of task groups, reporting to the

Process	Advantages	Disadvantages
(1) Capacity-Building Within State Education Agencies	Superior Knowledge of most appropriate state data sources	Need to call on regional data and regional experts
(2) Networking Among State Education Agencies	Credibility of mutually shared practical experience	Failure to tap external resources to improve policy-makin
(3) Expansion of Regional Council Central Staff	Combines credibility with potential for external expertise	May produce "too large a head, too small a body"
(4) Creation of Task Groups Combining Practitioners and Researchers	Capability to combine practical experience and research akills	Need for central structure to assure delivery of products
(5) Multiple Academically Based Centers	May match local skills with task group needs	Suspicions of academia; fragmentation of control and of personal contacts
(6) A single Academically Based Center	Provides central structure to link data base with indicator development	More suspicions of academia; dependence on local skills (though supplemented by external consultants)
(7) Cultivation of Contacts with Business/Industry	Access to private sector skills in strategic planning	Uncertainties concerning available resources pending further study

ALTERNATIVE PROCESSES FOR INDICATOR DEVELOPMENT

Figure 5

Council, that bring together researchers and practitioners in the common resolution of policy problems; (5) establishment of multiple centers, located within academic institutions, that will apply their expertise to the proposal and development of solutions to policy problems; and (6) establishment of a single center, academically based, that will provide expertise in the proposal and development of solutions to policy problems.

In the evolution of these alternatives, we have applied four principles which should be made explicit at the beginning. (1) As must be apparent in what has gone before, we believe that a partnership of effort is required, that research can provide valuable insight to practitioners, but that research must be illuminated by awareness of reality if it is to be of practical significance. (2) That in this partnership, the academic institution has suffered from a problem of credibility in interactions with the practitioner community. No doubt the faults lay on both sides. Practitioners envy the tenured self-protection and perceived indolence of the academic community and associate it with impracticality; academicians deride the short-time perspective and long-term thoughtlessness of the practitioner, and associate it with politics. Whatever the distribution of blame, partnership requires effort and the abandonment of old habits. (3) In the creation of mechanisms of interaction, there are advantages to centralization. We have already argued our belief that a data archive is an essential element in the development of effective policy research; we will shortly argue our belief in the need to provide an interactive mechanism for communication of results. Both arguments support the need for central structure. (4) Finally, we will not seek to argue in detail the need to seek regional solutions. We believe that the creation of the Regional Council is itself the evidence that those who know their states best believe there is something to be learned from their neighbors and that there are economies of scale in seeking regional solutions to region-wide problems.

These principles are applied in the estimates of advantage and disadvantage summarized in Figure 5. Capacity-building within the states should be an essential goal of the Council. We have earlier argued that for many state policy problems the state data resources are those most applicable. If any assistance is required, it is the temporary provision of help in developing a capability to solve problems in the future. This should, therefore, be a major goal of Council efforts. But in some areas centralized data collections are the best available, and the common development of regional use of these data resources in problem resolution is the most economical approach. In such areas long-term central efforts are clearly appropriate.

Some centralization of effort can be achieved without any more central staff than meets the description of a "clearinghouse." Often one state will be struggling with a problem that has been mastered--or at least subdued--in another. By providing a mechanism for communication and by identifying individuals with similar problems but better solutions in another state, the Regional Council can make substantial contributions to problem solution at minimum cost. Policy-makers in other states may be only a little wiser, but they will possess the credibility that academic researchers lack: They live in the same world of reality. Both solutions, therefore, meet the test of credibility; they fail, however, to meet the criterion of tapping the possible contributions in imagination and innovation that may be found among academic researchers.

For these reasons the expansion of staff within the Regional Council itself seems one of the most attractive options. As the deliberate creation of state policy-makers, the Council should not face substantive problems of credibility with the practitioners. The Council can at the same time by choice make itself an effective contact point with the academic community. We must record our own belief, therefore, that the Council is itself the most effective, credible, centralized interface between policy-making and research communities, and that an expansion of its staff would be fully justified. If there are concerns over the possibility that the Council itself may grow topheavy, with "too large a head, too small a body," there are also solutions. One is the "Scholar in Residence," with only a temporary assignment to the Council staff. A parallel might be temporary appointment to the Council staff of individuals from the state policy staffs. Both procedures possess the further advantage of creating the kinds of personal interconnection that contribute to the understanding of shared problems.

Regardless of the source of authority from which they derive, the creation of task groups to deal with indicator development seems a desirable strategy. The decision that educational research and indicator development within a given area represents a priority for action can be made by the Regional Council, reflecting the interests of the practitioners who deal with policy choices. The task force itself may be small, but should reflect the knowledge base of both practitioners and researchers and should be infused with the knowledge of data and literature to be provided through the staff of the Data Archive. A broader range of interests and perspectives may be achieved through appointment of Advisory panels. In an earlier draft we suggested a number of possible areas for focused indicator development, particularly: (1) indicators of changing enrollment demand on the educational system, measured in terms of numbers, age distribution, race, and social characteristics; (2) indicators of public confidence in education and public support for the educational system; (3) indicators of educational outcomes, failure rates, competency measures, development of skills needed for college entry or vocational achievement; (4) indicators of changes in educational decision-making processes, attitudes and involvement of interested groups, etc.; (5) indicators of changing economic functions with their impacts upon the vocational aspects of secondary and community college curriculum; (6) indicators of changing uses of leisure time, by children and adults, and their effects both upon student activities and upon curriculum; (7) indicators of the available employment pool, generally and for specialized categories of teachers; (8) indicators of changing skill needs in terms of their impacts on college-level preparatory programs; (9) indicators of the changing condition and operating costs of the physical plant, capital replacement needs, dilapidation, energy and food costs, etc.; and (10) indicators of the changing revenue productivity of patterns of fiscal support for education. Some of these indicator areas call for sequential development. Thus the estimation of economic change within the area, needed to prepare population projections in policy area (1), provides the basis also for the development of indicators in policy area (4), concerned with vocational demands upon the educational system. The indicators of employee availability contained in policy area (7) lead to estimates of shortfall that are the premises of policy area (8) measuring training needs. And so on. These are by no means the only possible selections, of course, and the choice of priorities must necessarily be made by the Council itself, but the Task Force structure is a useful one in dealing with indicator development.

The last two alternatives, the creation of an academically-based center or centers, we will treat together. Both alternatives suggest mechanisms for mobilizing academic research talent in the solution of policy problems. The major advantage of locating a center in an academic setting is that it provides the easiest means to bring people together to work together. A single center has the advantage of central authority; if located at the same site as the Data Archive it permits the reinforcement of computer terminal connections with personal contact. The limitation of a single center is its dependence upon local talent. Either a center or centers will function most effectively as they reach out to the broadest possible community of scholars and practitioners through task group organization. A tradeoff exists, however, that is visible to anyone who has relied upon commuting consultants. A team or taskforce that meets only irregularly can never be as mutually supportive or productive as one in regular face-to-face communication. The choice between center or centers should turn, therefore, on the selection of priorities for indicator development. Multiple centers will be equivalent to multiple institutionalized task groups and make sense, therefore, if they reflect: (1) defined interests in indicator development; and (2) parallel distributions of academic talent in multiple locations.

Whether organized as center or centers, the principal problem faced in an academic location is--again--that of credibility. An academic setting makes it easier to bring together academic researchers in the most productive environment; if they are not listened to, the exercise remains pointless. If policymakers are convinced academicians are irrelevant, even the best academic products will have no policy significance. Whatever the formal structure selected, this is a problem of communication with which the Council will have to deal. It is well equipped to do so. Whatever their other responsibilities, Council staff will always appear in the likeness of an interface.

We have not included within our range of alternatives what we might conceive of as a seventh possibility: (7) the cultivation of contacts with the business/industrial community to produce voluntary but valuable consultation on policy planning. Our failure to develop this alternative further does not constitute a rejection. As private sector firms increasingly develop capabilities for strategic planning, they necessarily are developing skills that may be of great help to educational policy-making. An estimation of the amount of help that could be obtained from such sources would require a survey of corporations within the southeastern region that we have not had time to conduct. We recommend, however, that Council staff further explore this possibility.

Clearly, our commentary adds up to no one recommendation but, quite positively, to a mixed recommendation. When requests are received for assistance from the states, Council may wish to assist from its own staff--dedicated always to the ultimate goal of capacity-building--by reference to other states, or--if sufficiently important--by the creation of task groups, mixing researchers, (business?) and practitioners, possibly in a two-tier structure of task group and advisory panel. The task group will be the preferred alternative when the problem is sensed by several or all states and/or defined as high priority by the Council. If task groups are established, they might report directly to Council staff, to an academically-based center, or to multiple centers. If multiple centers are established they are likely to take the form of institutionalized task groups and should be selected on the basis of identification of the problem as one of substantial, continuing importance. Whatever the structure chosen the central problem will be that of infusing academic research with practical wisdom and providing credibility to policy-makers for the products of academic research.

Dissemination of Results

The final aspect of the design will be treated more briefly, but not out of a sense of its unimportance. We believe that the indicators produced by the project will have value only insofar as they are displayed in a format that is clear and attractive to potential users. Since this aspect of the report is, however, treated in more detail in two appendices we will summarize our conclusions here.

Information communicated in graphic form is recommended as a way to make social indicators most usefully available to policy makers. The specific forms of representation would be statistical graphs and maps where appropriate. The computer can be used to produce graphic displays quickly at low cost. Several combinations of hardware and software are considered in more detail in Appendix 3. The use of SAS (Statistical Analysis System) graphics is recommended as the preferred analytic tool. At present this graphics package can produce high quality statistical graphs and it is anticipated that procedures to construct maps will be available in a future release. For less demanding applications, the APPLE II microcomputer offers possibilities for presentation graphics and/or use as a computer terminal when properly configured. All these graphic representations are available in color display for maximum legibility and effectiveness.

Access to a central database by users at remote locations can be accomplished via local telephone connection to a digital data network. One network is suggested for potential users, the Educational Computing Network (EDUCOM), set up to serve educational users who desire access to computing systems outside their immediate area. The use of EDUNET reduces the cost to the user and facilitates access by multiple terminals. Interactive terminals with graphic capabilities can provide both hard and soft copy output at the user's location for the purposes of analysis, presentation, or to produce figures for printed reports. (See Appendix 3.)

To this point we are describing techniques for the most effective presentation of the products of the indicator development and model-building activities described in the previous pages. In recent years governmental and industrial organizations in this country have begun to make extensive use of a variety of futures research techniques to assist decision makers in the selection of desirable courses of action under conditions of uncertainty. These techniques are intended to involve the decision-maker in the estimation of the future and involve qualitative and quantitative approaches to: (1) estimate the likelihood of an event's occurrence over time; (2) examine the probability of one event's occurrence affecting the likelihood of another event's occurrence; and (3) analyze the relationships among forecasted alternatives. Specific methodologies involved with these techniques include the Delphi technique, policy impact analysis, cross-impact analysis, trend-impact analysis, trend extrapolation, environmental scanning, monitoring, simulation modeling, simulation gaming scenario writing, technological forecasting, social forecasting, and ideological matrix prediction. Appendix 4 contains an annotated bibliography citing literature that describes many of the approaches. Some of the techniques possess the advantage that they not only incorporate into their projections the informed judgments of practitioners, but by involving the practitioner in the process of prediction, any likelihood that the results will be listened to and acted upon is maximized. We recommend that such strategic planning and futures research techniques be further explored for their applicability to educational planning and policy analysis.

Cost Estimates

Before presenting cost estimates it is desirable that we summarize our expectation of the operation of "the data base of educational indicators for use in policy analysis" we have been asked to design. Our understanding is expressed in schematic form in Figure 6. We assume that requests for assistance in policy planning will be generated both by individual states and, when the problem is sensed as one of general interest, by the Council as a whole. We assume also that Council staff and the staff of the Data Archive should not passively await inquiries and directives, but from their expertise and awareness will be active in suggesting to the Council possible lines of development. In some instances--where the problem and/or the relevant data are unique to a particular state--the response of the Council will be directed toward one state alone. In other instances, usually including those seen by the Council as region-wide in scope, the communication of Council output will flow to all the states.

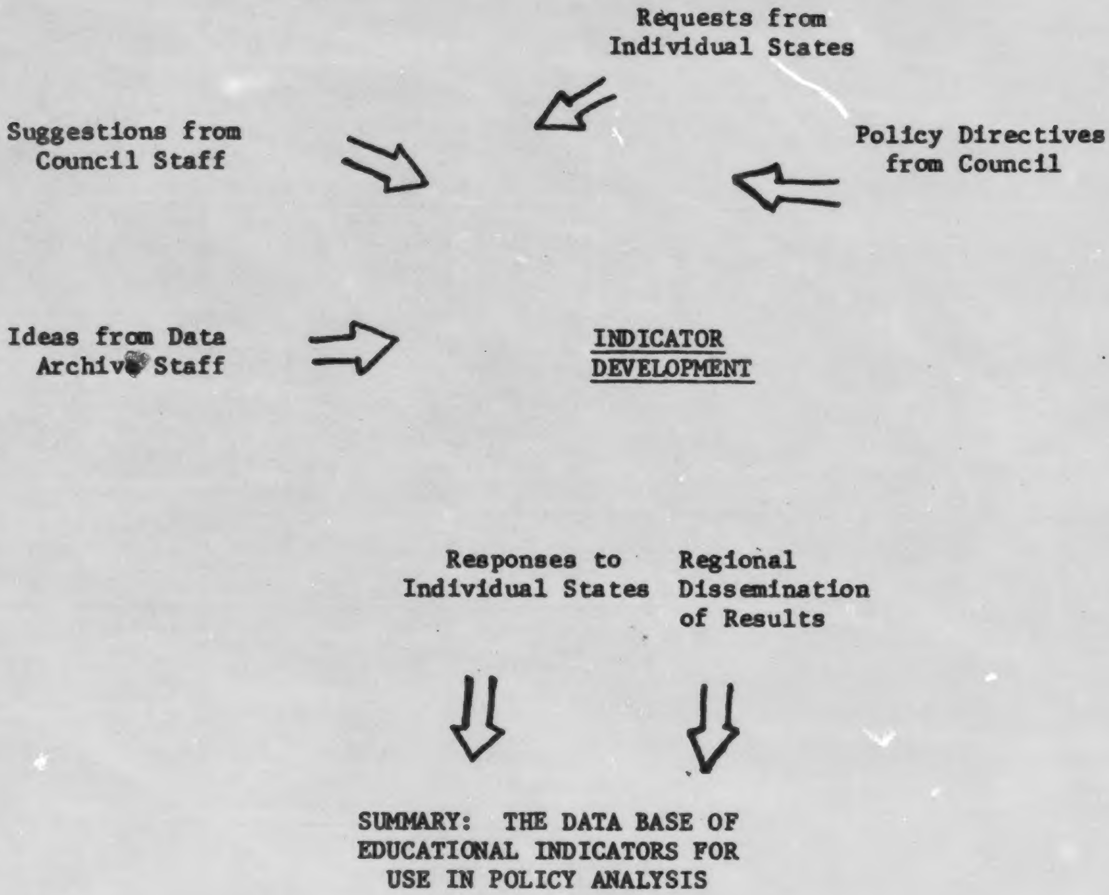

Requests from Individual States
Suggestions from Council Staff
Policy Directives from Council
Ideas from Data Archive Staff
INDICATOR DEVELOPMENT
Responses to Individual States
Regional Dissemination of Results
SUMMARY: THE DATA BASE OF EDUCATIONAL INDICATORS FOR USE IN POLICY ANALYSIS

Figure 6

We have suggested above a number of mechanisms for preparing such responses. Some of these call for direct response by the Council staff, either in answering individual inquiries--trouble-shooting--or in serving a clearinghouse function in "networking" among the states. We have also indicated our belief that Council staff must be increased to meet these needs and have suggested a mechanism, the "Scholar in Residence" or "Policy-Maker in Residence," that might be useful if the permanent Council staff is not to be increased.

For convenience in making cost estimates for the other functions discussed, we will assume that they will all be lodged within a single center. They might be otherwise divided, and it may be assumed that a division of tasks would produce some increase in administrative, supervisory, and secretarial costs, though it should not materially increase professional costs if an effective computer network for data exchange is established. We will present our estimates in terms of direct costs and in 1980 dollars; adjustments will obviously have to be made for indirect costs (overhead), where appropriate, and for the inflation factor estimated by the Council. It is also likely that any individual academic institution might wish to rearrange personnel responsibilities from the model we propose, by dividing positions and pairing them with other academic duties, including teaching. With adequate assurance that money provided by the Council will actually be spent on Council business, such arrangements may be highly beneficial and attract superior candidates.

With these caveats expressed, we propose the appointment of a Project Director at an annual, full-time salary of $35,000. The Project Director would have immediate responsibility for the organization and direction of Task Groups for specific purposes, and would exercise general supervision over the Data Archive and the Informational Dissemination units. The Project Director should have the support of an Administrative Secretary, who would provide secretarial support also to the other units; this salary is estimated at $14,500. All salaries are quoted to include fringe benefits, social security, retirement, etc.

Direction of the Data Archive requires a variety of skills: acquaintance with public data sources, programming skills necessary to manipulate the data, and training in social science sufficient to understand possible uses of the data and to recommend solutions. We estimate the salary of a Social Science Analyst/Programmer with these skills at $22,500. Routine maintenance of the Archive and processing of data tapes would require the assistance of a Data Processor, estimated at an annual salary of $13,500. (In subsequent years as the size of the Archive increases a Data Librarian should be added to this unit. The 1980 salary for such a person would be approximately $16,000.)

Development of the Information Dissemination services described would require the services of a senior programmer and a junior programmer. The senior programmer, who would direct this phase of the activity, is estimated at $22,500 per year, a junior programmer at $18,000.

Non-personnel costs, including the purchase of data tapes, software and hardware, as well as computer time, are estimated at $25,000 per year.

It is difficult to provide a total cost estimate for Task Group activities, since the level of effort is dependent upon the selection of indicator areas by the Council as priorities for development. A per unit cost can be estimated, however. It is our recommendation that a Task Group consist of four to five persons, combining in its membership practical experience and research skills. Three months of full-time effort by such a group, including payment of staff benefits, is estimated at $36,000. We recommend that an advisory panel be appointed in each case to extend the reach of experience made known to the Task Group. Meeting two to four times, such a panel, while not particularly expensive in terms of honoraria (which may in some cases be refused) will be expensive in travel costs. We estimate these costs at $6,000 for a total unit cost of $42.000.

Assuming appointment of two task groups within the year, therefore, the total budget proposed in direct costs at 1980 dollars is:

Project Director	$35,000
Administrative Secretary	14,500
Social Science Analyst/ Programmer	22,500
Data Processor	13,500
Senior Programmer	22,500
Junior Programmer	18,000
Non-Personnel Costs	25,000
Task Group I	36,000
Advisory Panel	6,000
Task Group II	36,000
Advisory Panel	6,000
TOTAL ESTIMATED COST	$235,000

APPENDIX 1

People and Organizations Contacted in Survey of Data Sources

People and Organizations Contacted in Survey of Data Sources

1. National Center for Education Statistics

-Jonathan Dorfman Data Tape Librarian	...(301)436-7944
-Statistical Information Office	...(301)436-7900

The following three individuals work to produce forecasts of enrollments and expenditures in the school system.

-Martin Frankel Mathematical Statistician	..(301)436-7919
-Mrs. Gerald Mathematical Statistician	...(301)436-7895
-Pat Kuch Educational Finance Economist	...(301)436-7895
-Mary Galloday Branch Chief, Foreign Institution Research	...(301)436-6684

She is involved with higher education, and developing indicators of interest in that area.

-Dr. Larry Suter Branch Chief, Elementary-Secondary Survey Branch	...(391)436-6729

2. Office of Evaluation and Dissemination, Dept. of Education

-Murray Spitzer Data Systems Coordinator	...(202)245-1950
-Carl Wisler Director, Elementary-Secondary Programs Division	...(202)245-7997
-Bob Moroney Director, Occupational & Handicapped Development Division	...(202)245-8877
-Sal Carralo Director, Post-Secondary Programs Division	...(202)245-7884
-Gerald Burns Evaluations Specialist	...(202)245-8364
-Janice Anderson Evaluations Specialist	...(202)245-8195

The office of Evaluation and Dissemination is most often involved with a number of one-time studies, in contrast to the on-going, systematic data-gathering activities of NCES, for example. This unfortunately means that the documentation for the projects (much less the data tapes themselves) is fragmentary and not standardized.

3. Machine-Readable Archive Division, National Archive and Records Service

   -Ross Cameron, ...(202)724-1080
   Archivist

4. National Center for Health Statistics, Dept. of Health, Education, and Welfare

   -Dale Hitchcock ...(301)436-7081
   Data Tape Librarian

5. Data Users Service Division, Bureau of the Census

   -Robert Clair ...(301)449-1600
   Service Officer

6. American Federation of Teachers ...(202)797-4400

   This association does not collect nor compute any first-hand data, but relies primarily on NCES data.

7. U.S. Chamber of Commerce

   -Madeline B. Hemmings, Associate Director, Human Resources and Employee Benefits Section ...(202)659-6107

8. American Council on Education (ACE)

   Paula Knepper

   ACE relies on NCES data on higher education

9. National Center for Higher Education Management Systems (NCHEMS)

   -Don Makowski ...(303)497-0319
   Senior Associate

   -Marilyn McCoy ...(303)497-0319
   Senior Associate

   NCHEMS relies primarily on NCES data, although they occasionally gather their own information. They are primarily interested in higher education material.

10. National Education Association

    -William Graybeal ...(202)833-5456
    Research Specialist

11. Data Resources Inc.

-Ruth Fullerbaum	...(202)862-3700
-Bill Olsen	...Lexington, Mass.

This company has worked under contract to NCES to develop a model to forecast enrollment and expenditures over the medium term (up to 10 years). They do not, however, collect their own data.

12. American Association of University Professors (AAUP)

-Maryse Eymonerie	...(202)466-8050
-Joan Berne, Administrative Secretary	...(202)466-8050

AAUP does not collect first-hand information.

13. Education Commission of the States

-Nancy Burton Post-Doctorate Fellow, University of North Carolina	...(919)933-5085
-David Wright Technical Services Coordinator	...(303)861-4917

The Education Commission of the States is responsible for overseeing the National Assessment of Educational Progress.

14. Stanford Research Institute

-Meredith Larson	...(415)326-6200
-Terri Middleton	...(415)326-6200

SRI has performed some work under contract to the office of Evaluation and Dissemination.

15. Southern Growth Policies Board

-Bud Skinner	...(919)549-8167

This research group does not complete any educational data beyond which is already available from other sources, primarily the Bureau of the Census. They appear to be more interested in the Bureau of Economic Analysis data.

APPENDIX 2

Synopsis of Data Sources

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
Merged Federal Files	*1975-76*	*Data from seven different federal surveys have been merged to form one comprehensive file at the school district level. The files include:* *-ELSEGIS: School District Universe* *-F-33: Survey of Local Gov't Finance* *-OCR: Elem. & Secondary School Civil Rights Survey* *-437: State Administered Program* *-EEO-5 Elem. & Secondary Staff Information* *-NIE: Special Tabulations by School District* *-Equal Property Value*	*A total of 289 variables including revenue, expenditure, investment, enrollment (including racial/ethnic,) grants, staff, poverty/welfare, and property value information.*	*Universe of School Districts*	*2 reels, $124*	*NCES(1)*
Merged Federal Files	*1976-77*	*-As above-*	*-As above-*	*School district*	*2 reels $124*	*NCES(2)*
Anchor Test	*April 1972* *April 1973*	*To produce tables of score correspondence among widely used reading tests, and to produce representative norms nationally*	*Reading scores by date of birth, sex, grade level, mother tongue, community-level data, etc.*	*Below state level*	*2 reels $124*	*NCES(3) pp. 9-10*
1970 Census School District Fourth Count/1970 Elementary-Secondary Education General Information Survey (ELSEGIS)	*1976*	*To allow census socioeconomic data to be matched with institutional data*	*Income, educational attainment, age, enrollment, mother tongue, nativity; occupation, number of teaching staff; finance, budget, revenues, etc.*	*Below state level*	*3 reels $154*	*NCES(3) pp. 11-1*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
Consolidated Program Information Report (CPIR)	*1971-72, 1972-73*	*To collect nationally-representative statistical data from local education agencies (LEA's) on Federally assisted programs*	*Participation, staffing; and expenditures on specific programs*	*Below state level*	*1 reel/ year, $94/year*	*NCES pp. 13-14*
Elementary and Secondary Education Finance Data	*1969-70, 1970-71, 1972-73 through 1976-77*	*To provide statistics on the finance of local public school districts, to determine education needs, and how resources used.*	*Revenues by local state and Federal sources, expenditures, capital outlay; average daily attendance, etc.*	*Below state level*	*1 reel/ year, $94/year*	*NCES(3) pp. 15-16*
ELSEGIS - Non Public School Universe	*1970, 1976, 1977 in progress*	*To provide for the entire non-public sector of elem. and secondary schools data comparable with those for public schools.*	*Name, address, district, curricula offered, number pupils, staff, etc.*	*Below state level*	*1 reel/ year, $94/year*	*NCES(3) pp. 17-18*
ELSEGIS - Public Secondary School Course offerings, Enrollments, and Curriculum Practices	*1973*	*To provide information concerning the subjects offered in public high schools*	*Courses and occupational programs offered; type, size, location of school; length of course, etc.*	*Below state level*	*2 reels, $124*	*NCES pp. 21-22*
ELSEGIS - Public School System	*1969 through 1973; 1975 through 1977*	*To draw statistically valid samples from which state or national estimates can be made*	*Name, address, county, grade span, average daily attendance, SMSA designation*	*Below state level*	*1 reel/ year $94/year*	*NCES(3) pp. 19-20*
ELSEGIS - staff	*1969-70 through 1971-72*	*To provide a comprehensive listing of school systems by size, pupil/staff ratios, etc.*	*Number of personnel by position, professional/ non-professional pupil membership, etc.*	*Below state level*	*1 reel/ year $94/year*	*NCES(3) pp. 23-24*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
EEO - 5: Elementary-Secondary Education Staff Information Survey	1973-74, through 1975-76	To monitor compliance with civil rights legislation which prohibits discrimination in employment	Number of staff by position, professional, nonprofessional, pupil membership, etc.	Below state level	1 reel/ year $94/year	NCES(3) pp. 25-26
High School Dropout Data from Census Public Use Sample Extract of 14-21 year-olds	1960, 1970	To compare socioeconomic, demographic, and family background of dropouts and attendees	Full Census information, plus demographic and socioeconomic variables, neighborhood indicators, family characteristics, etc.	Below state level	NA	NCES(3) pp. 27-28
National Assessment of Educational Progress (NAEP)	1970 through 1976	To obtain information on educational achievement for varied age groups	Sex, race, parental education; size and type of community, region; math science, social studies, music, reading, etc.	National	See end of this Appendix	NCES(3) pp. 29-30
National Longitudinal Study (NLS)	1972, 1973, 1974, 1976	To determine what happens to young people concerning education, and ultimate place in labor force	Date of birth, sex, ethnicity; test scores, grades, class, work experience, etc...	Regional	4 reels, $250	NCES(3) pp. 31-32
School, TV Utilization study	1977	To study availability, attitudes towards, and use of institutional TV	Use, availability, training, attitudes, equipment	National	1 reel, $94	NCES(3) pp. 33-34
Survey of Teachers' Language Skills	1976-77	To estimate the number of public school teachers to teach children with non-English language backgrounds	Teacher's nationality and language background, ability, experience, training, etc.	State	1 reel, $94	NCES(3) pp. 35-36

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
Elementary and Secondary School Civil Rights Survey	*1968 through 1976 (1978 in progress)*	*To obtain data which reflects the degree to which elementary and secondary schools comply with various civil rights mandates*	*Number of students by race, ethnic group, gender by enrollment, discipline, dropouts, graduates, busing, handicapped, etc.*	*Below state level*	*NA*	*NCES(3) pp. 37-38*
State use of Federal Education Funds under State Administered Programs	*1975 through 1977*	*To report state uses of Federal education funds under 26 state administered programs*	*Amount of grant, previous year's expenditures, participants, type of grant, etc.*	*Below state level*	*1 reel/ year, $94/year*	*NCES(3) pp. 39-40*
Equal Employment Opportunity Commission	*1973-74*	*To monitor compliance with civil rights legislation which prohibits employment discrimination*	*Personnel by job classification, principals, and other staff by sex and race etc.*	*Below state level*	*4 reels/ year, $260/year*	*NCES(2) pp. 41-42*
Assessment of Career Development and Career Planning - Grades 8-11	*1973*	*To study career-related characteristics of students, and to determine general career understanding level*	*Socioeconomic status, educational background, race, sex, interest, experience, ability scores, career preferences, etc.*	*National*	*2 reels, $130*	*NCES(3) pp. 43-44*
Safe School Study (ICPSR No. 7662)	*1976-77*	*To determine extent of crime or violence in elementary and secondary schools, type and seriousness, and prevention*	*Time, date, location of any crime; victims, offenders, by sex, status, age, security, measures, school characteristics, etc.*	*National*	*2 reels, $130*	*NCES(3) pp. 45-46; ICPSR p. 14*
Study on Compensatory Education	*1970 through 1977*	*To obtain information on ESEA Title I fund allocation, the nature of compensatory education services*	*Student characteristics, program offerings, costs, test scores, attitudes, eligibility, administrative data*	*Below state level*	*12 reels $780*	*NCES(3) pp. 47-48*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
Project Talent-11th Grade Public Use Sample	*1960, 1961, 1965, 1971*	*To understand nature and development of the talent of youth*	*General ability, aptitudes, talents, interests, activities, family background, plans, etc.*	*Below state level*	*1 reel, $65*	*NCES(3) pp. 49-50*
Experiment in Performance Contracting	*1970 through 1972*	*To determine if performance contracting is more cost-effective to improve reading and mathematics achievement*	*Program objectives, grade, site, parents' attitudes; family history, race, sex, attendance, and scores on standardized tests*	*National*	*4 reels, $260*	*NCES(3) pp. 51-52*
School Superintendent's Study-Public Use Version	*1976*	*To provide a national assessment of school desegregation*	*Educational quality, student achievement, discipline, attendance, participation, attitudes, etc.*	*National*	*1 reel, $65*	*NCES(3) pp. 55-56*
Current Population Survey (CPS), October Supplement	*1976 through 1978*	*To obtain a national count and social and demographic characteristics of person 3 years old and over in the civilian, noninstutionalized population enrolled in school*	*Full-time, part-time, public and private enrollment by education level, age, sex, race, family income, marital status, residence, and persons not enrolled*	*Below state level*	*NA*	*NCES(3) pp. 125-126*
Survey of Income and Education	*1976*	*To obtain a count in each state of children 5-17 years old living in families; those who face language difficulty, obtain information on welfare, school enrollment, and educational attainment*	*Current employment status, work experience, language spoken, welfare benefits and educational attainment*	*Below state level*	*approx. 15 reels, approx. $900*	*NCES(3) pp. 129-130*
Survey of Income and Education - Elementary/Secondary Extract	*1976*	*To update poverty counts for ESEA Title I allocations and obtain information on languages*	*Poverty level, languages, ethnicity, race, income level, and other socio-economic data*	*SMSA's*	*3 reels, $154*	*NCES(3) pp. 137-138*

AME	DATE(S)	OBJECTIVES	VARIABLES (INDICATORS)	ACCESS LEVEL	COST	REF
ealth Examination urvey - Children, ges 6-11	*1963-65*	*To obtain information on medical and developmental characteristics of children through questionnaires, and tests*	*Age, race, sex, school grade, region, detailed medical history, academic standing, vision, hearing tests, etc.*	*National*	*$125*	*NCES(3) pp. 145-146*
ealth Examination urvey - Youths, ges 12-17	*1966 through 1970*	*To obtain information on medical and developmental characteristics of youths through detailed questionnaires and medical dental, vision, hearing, and anthropomophic tests*	*Demographic, family school information, detailed medical history; health habits; vision, hearing, and other difficulties, lifestyle data; cigarette smoking, etc.*	*National*	*$125*	*NCES(3) pp. 145-14*
atality Data Tape	*1969 through 1977*	*To obtain statistics of the number and characteristics of births within the U.S.*	*Resistence of mother, age and education of parents, birth weight, race, sex of child, etc.*	*State*	*NA*	*NCES(3) pp. 153-15*
id to families ith Dependent hildren (AFDC)	*1967,1969, 1971,1973, 1977*	*To obtain information about the demographic and program characteristics of AFDC families*	*Family size, relationships, race, resources, income; age, education of parents; age and school enrollment of children, etc.*	*State*	*NA*	*NCES(3) pp. 155-15*
age and Salary orker Employment ata for Educational Services	*Monthly beginning in 1939 for states, 1958 for most areas, and 1955 for the nation*	*To provide employment data for educational services and for state and local government education industries*	*Published employment for the nation, 50 states, D.C., and 230 Labor Areas for Educational Services*	*Below state level*	*NA*	*NCES(3) pp. 197-19*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	RE
School Library Media Center (LIBGIS I)	*1974, (1978 in progress)*	*To obtain information on resources, finance, and employees of school library media centers.*	*Type and level of school libraries, and media centers, employees, expenditures, and physical facilities, etc.*	*Below state level*	*1 reel $94*	*NCES(3) pp. 215-*
Sustaining Effects Study (SES)	*1976-77*	*To study compensatory education and its nature, quality, environment; its sustained effects, generality, and cost-effectiveness*	*Comprehensive tests of basic skills in reading, math; student attitudes; educational programs; as well as various demographic and socioeconomic variables*	*Regional*	*NA*	*SES(1)*
Non-Fiscal Data	*N/A*	*To obtain non-fiscal data on schools in U.S.*	*Number of superintendents, teachers, guidance counselors, and pupils for local education agencies*	*Below State level*	*N/A*	*NCES(4)*
Youth in Transition (SSA 3505)	*1966 through 1974*	*Longitudinal study of tenth grade students in 1966 and following for four years*	*Ability background, academic skills, values, attitudes, plans, behaviors, etc.*	*National*	*NA*	*ICPSR p. 332*
High School Seniors Cohort Study (ICPSR 7575)	*1965, 1973*	*To provide information about social and political climate of peer group for high school seniors*	*Abilities, family background, academic skills, values, attitudes, etc.*	*National*	*NA*	*ICPSR p. 337*
National Survey of Youth (SSA 3509)	*1967*	*To measure frequencies and seriousness of delinquent activity*	*Family characteristics, family education; attitudes toward school, peer group; job aspirations, etc.*	*National*	*NA*	*ICPSR p. 336*
National Survey of Youth (ICPSR 7593)	*1972*	*Continues research in above-mentioned study*	*-as above-*	*National*	*NA*	*ICPSR p. 335*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
Student-Parent Socialization Study	*1965*	*To study the evolution of political attitudes and intergenerational influence on the process*	*Attitudes towards school, family life, political parties; and parent's attitudes toward family life, political attitudes, etc.*	*National*	*NA*	*ICPSR pp. 337*
How Americans View the Public Schools (Gallup Opinion Index)	*Annual since 1969*	*Attitudes towards and reactions to a variety of social programs and policies*	*School discipline, segregation/busing, financial support, quality of teachers, etc.*	*National*	*NA*	*Gallup Opinion Index (1978)*
Crisis in High Schools (Harris 1913)	*1969*	*Sample of attitudes towards educational system from high school students*	*Courses, attitudes, teacher sympathies, pluc background information on parents, etc.*	*National*	*$50*	*Social Science Data Library*
Attitudes Toward School System (Harris 2623)	*1976*	*Survey of attitudes towards educational system*	*Teaching skills, safety, busing, racial balance, discipline, etc.*	*Jefferson & Louisville Co., Kentucky*	*$50*	*Social Science Data Library*
Omnibus Harris Opinion Poll (Harris 1522)	*1965*	*Wide-ranging opinion poll, but containing a block of questions on education*	*Quality of schooling, teachers, classroom size, parochial and private schools, etc.*	*National*	*$50*	*Social Science Data Library*
Omnibus Harris Opinion Poll (Harris 7585)	*1975*	*Another wide-ranging opinion poll, but containing a block of questions on education*	*Convenience, satisfaction with busing, agree/disagree with busing, racial balance, etc.*	*National*	*$50*	*Social Science Data Library*

NAME	DATE(S)	OBJECTIVES	(INDICATORS)	LEVEL	COST	REF
National Assessment of Educational Progress (NAEP)		*NAEP uses a highly detailed probability sample of young people to assess their educational achievement, and to chart changes in those abilities over time. Respondents include 9-, 13-, and 17-year old youths, and young adults aged 26-35. Different learning areas are studied every year, including art, career and occupational development, citizenship, literature, mathematics, music, reading, science, social studies, and writing.*	*Background variables vary from study to study, but usually include: sex, race, grade, home environment, parent's education, birth date of the respondent; plus school information such as Geographic region, school grade range, size and type of community, principal's estimate of occupational distribution in community, and school enrollment*	*Regional*	*approx. $100 each*	*NAEP*
NAEP Math (Ages 9, 13, 17, Adult)	*1972-73*	*As above*	*As above, plus math exercises only*	*Regional*	*$100*	*NAEP*
NAEP Science (Ages 9, 13, 17, Adult)	*1972-73*	*As above*	*As above, plus science exercises only*	*Regional*	*$100*	*NAEP*
NAEP Career and Occupational Development (Ages 9, 13, 17, Adult)	*1973-74*	*As above*	*As above, plus career exercises only*	*Regional*	*$100*	*NAEP*
NAEP Citizenship and Social Studies (Ages 9, 13, and 17	*1975-76*	*As above*	*As above plus relevant scores*	*Regional*	*$100*	*NAEP*
NAEP Selected Supplemental Math (Ages 13, 17)	*1975-76*	*As above*	*As above, plus math scores*	*Regional*	*$125*	*NAEP*

NAME	DATE(S)	OBJECTIVES	VARIABLES (INDICATORS)	ACCESS LEVEL	COST	REF
NAEP Mathematics Changes	*1972-73, 1977-78*	*As above*	*As above, plus math scores*	*Regional*	*$125*	*NAEP*
NAEP Science (Age 9)	*1976-77*	*As above*	*As above, plus science scores*	*Regional*	*$125*	*NAEP*
NAEP Reading and Literature (Age 9)	*1970-71*	*As above*	*As above, plus reading and literature scores*	*Regional*	*$100*	*NAEP*
NAEP Reading and Literature (Age 13)	*1970-71*	*As above*	*As above plus reading and literature scores*	*Regional*	*$100*	*NAEP*
NAEP Reading and Literature (Age 17)	*1970-71*	*As above*	*As above plus reading and literature scores*	*Regional*	*$100*	*NAEP*
NAEP Reading and Literature (Adult)	*1970-71*	*As above*	*As above, plus reading and literature scores*	*Regional*	*$100*	*NAEP*
NAEP Music (Age 9 & 13)	*1971-72*	*As above*	*As above, plus music scores*	*Regional*	*$100*	*NAEP*
NAEP Music (Age 17 and Adult)	*1971-72*	*As above*	*As above, plus music scores*	*Regional*	*$100*	*NAEP*
NAEP Social Studies (Age 9 & 13)	*1971-72*	*As above*	*As above, plus social studies scores*	*Regional*	*$100*	*NAEP*
NAEP Social Studies (Age 17 and Adult)	*1971-72*	*As above*	*As above, plus social studies scores*	*Regional*	*$100*	*NAEP*
NAEP Science (Age 13)	*1976-77*	*As above*	*As above, plus science scores*	*Regional*	*$125*	*NAEP*

NAME	DATE(S)	OBJECTIVES	VARIABLES (INDICATORS)	ACCESS LEVEL	COST	REF
NAEP Science (Age 17)	1976-77	As above	As above, plus science scores	Regional	$125	NAEP
NAEP Science, Energy, Reading, Health (Age 26-35)	1977	As above	As above, plus relevant scores	Regional	$125	NAEP
NAEP Mathematics (9, 13, & 17)	1977-78	As above	As above, plus math scores	Regional	$125	NAEP

Notes About Cost Structure

1. The cost structure for those tapes held by the National Center for Education Statistics (NCES) is $94 for the first reel, and $30 for any additional reels within any particular data set. This structure is repeated for each year of a multi-year report.
2. For the National Archive and Records Service, the charge is a flat $65 per reel, regardless of how many reels exist in a data set.
3. Data tapes held by the Bureau of the Census cost $80 per reel, again with no discount for multi-reel data sets.
4. The National Center for Health Statistics charges a flat rate of $125 per data set, regardless of how many reels it contains.
5. In all cases, substantial savings may be realized by ordering a large number of data bases at a time. Since most tapes are not completely filled by any one data base, it is possible to put several other data bases on any tape thereby reducing the cost.
6. All costs noted above include complete documentation of each data set.

References:

NCES(1): "Data Base Documentation- Merged Federal Files-Academic Year 1975-76", National Center for Education Statistics", DHEW.

NCES(2): "Data Base Documentation-Merged Federal Files-Academic Year 1976-77", National Center for Education Statistics", DHEW.

NCES(3): "Directory of Federal Agency Education Data Tapes", National Center for Education Statistics, DHEW, 1979.

NCES(4): Personal Communication, Dr. Larry Suter, National Center for Education Statistics, DHEW, (301)436-6729

SES(1): Hemenway, Judith A., Ming-mei Wang, Charles E. Kenoyer, Ralph Hoepfner, Moraye B. Bear, Gerrie Smith; "The Measures and Variables in the Sustaining Effects Study", Office of Evaluation and Dissemination, U.S. Office of Education, Dec. 1978.

ICPSR: "Guide to Resources and Services 1979-1980", Inter-University Consortium for Political and Social Research.

Gallup Opinion Index: "How Americans View the Public Schools", Gallup Opinion Index, Report No. 151, February 1978.

Social Science Data Library: The personnel and resources of the Social Science Data Library, Institute for Research in Social Science, University of North Carolina at Chapel Hill.

NAEP: "User Tapes - National Assessment of Educational Progress", Education Commission of the States, Denver Colorado.

APPENDIX 3

Introduction

Most information can be communicated between people in oral, written or pictorial form. The pictorial or graphic form of communication is becoming more important since the volume of socioeconomic data has been growing rapidly and is expected to do so in the future. The power of graphics is evidenced by the capacity of a single graphic to communicate large amounts of information, when compared to written or oral forms.

While the ability of the computer to handle large volumes of numerical and textual data has been demonstrated, its output largely consists of printed tables of information. This written form of output still requires additional human effort to read and digest before information can be applied to a problem. As the tables increase in number and the piles of computer "printout" grow, the process of obtaining and using information evolves into a bottleneck in the management of an organization.

The bottleneck can be eliminated when appropriate types of information are represented in a graphical format. If a graphic representation of the data must be rendered manually, however, a significant lag between the time information is processed and its eventual use may still be too great. The application of computer technology to the production of graphics from processed data will reduce this time lag. Thus, information which is to be used by an organization for decision or policy making will be available in a form which is easy to comprehend and immediately available for use as it comes directly from the computer. Computer graphics knowhow now exists which makes this capability economically feasible for many organizations. Computer graphics can now move out of the engineering and design laboratories and into management offices.

Graphics Hardware and Structure

Moving computer graphics out of the laboratory has been an evolving process dependent on both hardware and software development and price decreases associated with volume production. For example, the Domestic Information Display System (DIDS), an interactive color computer mapping system, borrowed technology originally developed by NASA to examine remotely sensed images of the earth scanned from an orbiting satellite. A one-of-a-kind laboratory system until recently but reconfigured to take advantage of off-the-shelf components, DIDS will be moving into university and governmental environments for testing in the near future. On the lower end of the computing scale, the Apple II, a desktop personal microcomputer system has a color graphics capability and has been available to the public at a low cost ($1500-$2000+) for the past several years. Given this range of hardware, what is the best available computer system for cartography and statistical graphics which can be used at present in a university or governmental setting? The answer still largely depends on what hardware is presently available for an organization, what funds are available, and what is needed to meet the present and future requirements of the particular organization. The number of available choices is growing. For example, the DIDS system has a cost approaching $100,000 and has not yet been installed or tested outside Washington, D.C.

Next, there is the possibility of installing software on a mainframe (i.e. an IBM 370 system) to the advantage of existing hardware. Two likely graphic candidates include the ODYSSEY computer mapping system developed by the Harvard Laboratory for Computer Graphics and Spatial Analysis. While it is a powerful, interactive color computer mapping system, it has not been released at this time and is expected to cost in excess of $40,000 for the software alone.

The SAS Institute, Inc. in Cary, North Carolina has recently released a color graphics system called SAS/GRAPH to be used with the Statistical Analysis System (SAS). This package runs on IBM 370 systems or equivalent. Future enhancements will include standard computer mapping procedures. The cost of the graphics package is $2500 for the first year plus $1000 per year thereafter (for maintenance) to a commercial installation. (The cost is much less to a university.) The SAS graphics package will allow the user to take advantage of all regular statistical analysis and data management features to produce hard or soft copy output on numerous graphics devices.

At the low end of the computing scale, the Apple II microcomputer has a color graphics capability. While somewhat limited with respect to DIDS and SAS, it can be very effective when working with small datasets and graphic output that doesn't involve highly complex, live drawn figures. Inexpensive software, available from commercial and non-commercial sources enables the Apple to produce presentation quality graphics (i.e. "slides"). Its light weight makes it highly portable, unlike the hardware in other computer graphics systems. Its graphics output device can be an ordinary color or black and white television set, a TV monitor or a projector television such as the Advent or another like it. All the above devices accept a standard television signal (NTSC compatible) or one modulated for a standard TV channel. Various other hardware attaches to the Apple II to enhance its graphic capabilities for both input and output. It is available locally at a low cost and is on the North Carolina State Contract. Other non-graphic uses of the system makes it a versatile office tool when other software is used with it. Text processing and bookkeeping systems are examples of other applications.

The above review of hardware/software systems is not an exhaustive, general review. Such a review could fill an entire book. More extensive reviews of graphics hardware and software are available commercially and also appear from time-to-time in computer journals. The above mentioned systems appear to have features that would be useful to the Southeastern Council for Educational Improvement in fulfilling its mission to its member states. The use of the SAS/GRAPH system and its projected enhancements should allow a user to access and use county level data in a research setting for statistical analysis and graphic display. The Apple II system will provide a low-cost capability for presentation type graphics and some limited analysis. Most important, the systems mentioned immediately above can fulfill many user needs within a limited budget and are presently available.

Alternative Data Communications Networks

The use of large data bases, including the United States Census of Population and Housing will require a large scale data processing system. Social indicators can be derived from census data to give single value for each enumeration area in a region. A database containing information from many diverse sources must be accessible within a single computing center. This facility must be easy to access by all potential users of the database. The database itself must be managed constantly to insure the timely addition of new data as it becomes available from various organizations. The ability to build, maintain and access a database is an important consideration in its design and establishment.

Data is recorded in machine-readable form by many organizations, in diverse formats and on computer systems using numerous coding schemes which may be incompatible. The data must often be checked and preprocessed to get it into files which can be used by the computer, its software system. Once data is entered into files and cataloged, other operations such as the periodic backup of data must occur at regular intervals. Data with low or no usage can also be stored for possible future access.

The active data in the database must be readily accessible from interactive or batch terminals for remote users. These users might be located less than one mile from the computer or possibly hundreds of miles away in a different city or state.

Telephone hookups are a typical way to access a computer from an interactive terminal. Users who dial a local number can access the computer at nearly no cost other than a flat monthly charge. Distant users must often pay a long distance telephone charge which can grow rapidly if used for extended periods.

Digital transmission networks have been established to provide long distance communications at a reasonably low cost to the user. Commercial digital networks such as TELENET or TYMNET are examples. Educational users have formed an organization called the Educational Computing Consortium (EDUCOM) which purchases services from the commercial communication networks at a bulk rate and resells it to members at a cost lower than could be achieved by a single user. The networks have established local telephone numbers in many cities in the United States which allow local users to access the system with a local telephone call. The resulting communications charge is not distance dependent, thus users can connect to a remote host computer anywhere in the United States for a flat charge based on connect time. In addition, the network itself resolves differences between various types of interactive terminals which facilitate use of the system.

The database to be established by the Southeastern Regional Council for Educational Improvement could be located at the Triangle Universities

Computation Center (TUCC) in Research Triangle Park, North Carolina and allow access by their constituent organizations to their entire databases at a low cost to each individual user. This would eliminate the need to duplicate the entire database in several places. The option to physically transfer individual datasets to users would exist when and if the need should arise. The access to files either by an interactive terminal from a remote location or the physical transfer of data stored on magnetic media could be easily accomplished. Thus, database users can be effectively served from a single computation center at a low cost and in a timely manner.

In conclusion, a database at TUCC would be readily accessible by remote users who use SAS to analyze the data. The results could be output in tabular or graphic formats for research and/or presentation purposes. The user hardware could range from the Apple II setup for communications to more sophisticated graphics terminals. The terminal chosen by the user will depend on his needs and his budgetary constraints.

APPENDIX 4

Annotated Bibliography of Literature on Social Indicators, Future Studies, and Policy Analysis

Annotated Bibliography

The bibliography is divided into three major sections: social indicators, future studies, and policy planning and analysis. In addition, the first two sections are subdivided into sources (handbooks, bibliographies, etc.), general/state-of-the-art, theoretical, methodological, and educational references.

The references and abstracts were retrieved from the following sources (indicated at the end of each abstract):

1) Educational Resources Information Center (ERIC)

2) National Technical Information Service (NTIS)

3) American Psychological Association, Psychological Abstracts (PSYCH AB)

4) Sociological Abstracts (SOCIOL AB)

5) Abstracted Business Information (INFO)

6) Gilmartin, K.J., et al. Social indicators: An annotated bibliography of current literature. 1979. (G)

7) Rossi, R. J., & Gilmartin, K. J. Handbook of social indicators. 1980. (R/G)

8) World Future Society. The future: A guide to information sources (2nd edition). 1979. (WFS)

9) Cornish, E. The study of the future: An introduction to the art and science of understanding and shaping tomorrow's world. 1977. (C).

10) Abstracts which have AUTHOR at the end were written by the author him/herself. When the abstract was written by a member of the project staff, no reference is made to the source of the abstract.

SOCIAL INDICATORS: BIBLIOGRAPHIC SOURCES

Ferriss, A.L. National approaches to developing social indicators. Social Indicators Research, 1975, 2, 81-92.

The basis for selecting social indicators in ten national publications released to date are primarily measures of welfare and measures reflecting public policy and social concerns. The orientation of the volumes from the U.S., France, Canada, Norway, Philippines, Malaysia, Great Britain are discussed. The selection of time series that reflect social processes is proposed and an orientation presented around the concepts of the vital processes, socialization and participation, mobility and stratification, maintaining security, and control and coordination by which social order is attained. A bibliography identifies the national reports known to the author. (AUTHOR)

Gilmartin, K.J., et al. Social indicators: An annotated bibliography of current literature. New York: Garland, 1979.

This bibliography supplements the partially annotated compilation of references to works on social indicators prepared by Wilcox, Brooks, Beal, and Klonghan (Social Indicators and Societal Monitoring: An Annotated Bibliography, 1972). It focuses on literature published during the period 1972-1978 while at the same time including key historical works on the subject published prior to 1972. The authors describe this bibliography as the most comprehensive and the most extensively annotated one available on social indicators for the 1972-1978 period.

The bibliography is divided into seven major sections: Key Historical Works Published Prior to 1972; State-Of-The-Art Overview of Social Indicators Research; Theoretical Approaches to Constructing Social Indicators; Methodological Approaches to Constructing Social Indicators; Analyzing and Reporting Social Indicators; Examples of Social Indicators Used or in Use; and Bibliographies of Social Indicators Research.

Within each section, references are listed in chronological order, the earlier publications listed first.

Rossi, R.J., & Gilmartin, K.J. The Handbook of social indicators: Sources, characteristics, and analysis. New York: Garland STPM Press, 1980.

The authors of this handbook are the founders and directors of the Social Indicators Research Program of the American Institutes for Research and organizers of the Special Interest Group on Social Indicators Research of AERA. The book is intended for all who are concerned with the measurement of social change: policymakers, planners, evaluators, researchers, practitioners, and all other students of the social sciences. It is written in the most simple and straightforward manner possible.

Rossi and Gilmartin provide the reader with both a conceptual grasp of the idea of social indicators and a set of practical guidelines. In nine basic but comprehensive chapters the authors survey the entire field of the "social indicators movement", providing ample illustrations and practical examples, and supplement their treatment of the field with a glossary of terms and an annotated list of suggested readings at the end of each chapter.

In particular, they give a brief history of the "social indicators movement" in the US and abroad, describe the various definitions, typologies, and uses of social indicators that have been suggested, and outline the important characteristics and their importance for various functional types of indicators. In chapters four through six Rossi and Gilmartin turn their attention to constructing social indicators, present the varieties of existing and new data sources and data collection strategies that can be used in establishing social indicators, and evaluate the advantages and disadvantages of each one. Chapters seven and eight review the methods that can be used to combine and weigh indicators to form composite indices, describe potential problems with each of these methods and how to correct for sources of extraneous variation in an indicator, and discuss the methods, aims and limitations of the most important ways of analyzing social indicators.

SOCIAL INDICATORS: GENERAL

Bauer, R.A. (Ed.). *Social indicators*. Cambridge, Mass.: M.I.T. Press, 1966.

In this second volume of a series prepared by the American Academy of Arts and Sciences for the National Aeronautics and Space Administration (NASA) on the impact of the space program on American society, Bauer and his colleagues examine the need to anticipate the consequences of rapid technological change. Two contributors' chapters, Albert Biderman's on social indicators and goals and Bertram Gross' on social systems accounting, have become "classics" in the social indicators literature.

Biderman discusses existing social indicators in terms of their relationships to national goals, the ways in which such statistical series originate, and the multiple uses to which they are put. He illustrates by using crime rates as an example of a set of indicators that the problem of inadequate and inaccurate statistics is serious and asks whether one might not be better off with no indicators at all than with highly misleading ones as currently in use.

Gross presents a general model for an international system of social accounts. According to the model, the state of any nation at any time period can be analyzed in terms of two interrelated, multi-dimensional elements: system structure and system performance, which are further broken down into 20 and 21 more specific elements, respectively. Gross stresses the usefulness of developing a comprehensive system description before constructing indicators for particular subsystems. (For Biderman and Gross: see also abstracts below).

Two other chapters, Biderman on "Anticipatory Studies and Stand-By Research" and Rosenthal, R.A., & Weiss, R.S. on "Problems of Organizational Feedback Processes" draw attention to more specific aspects and uses of social indicators research.

Biderman, A.D. Social indicators and goals. In R.A. Bauer (Ed.), *Social indicators*. Cambridge, Mass.: M.I.T. Press, 1966.

The author discusses existing social indicators in terms of their relationships to national goals, the ways in which such statistical series originate, and the multiple uses to which they are put. One of Biderman's objectives is to convince the reader that the problem of inadequate and inaccurate statistics is indeed a serious one and not a matter of trivial technical niceties. Crime rates are taken as a case example of a set of indicators with such serious problems that we might be better off with no indicators at all than with the highly misleading ones that are used. Biderman explores the constraints on how we might set up an ideal set of social indicators for evaluating the state of society. (G)

Duncan, O.D. Developing social indicators. *Proceedings of the National Academy of Sciences*, 1974, *71*(12), 5096-5102.

Recent progress in developing social indicators is described in terms of six activities. In regard to social bookkeeping, the number of domains covered by population surveys is being expanded, and survey data are being more widely disseminated. In social accounting, demographic stock-flow schemes show promise of integrating systems of social statistics. Social science theories have provided models of achievement and other social processes. Social forecasting is potentially an important component of work on social indicators, but a new definition of the purpose of forecasting is needed. The practice of social reporting is best exemplified in the work of recent commissions. Social advising, while it draws upon social indicators, involves functions that cannot be performed by any system of indicators alone. The author concludes that the long-run effect of developing social indicators is not calculable; however, social indicators have the power to alter our fundamental ideas about human desires and possibilities, which in turn may change society. (G)

Duncan, O.D. Toward social reporting: Next steps (Russell Sage Foundation Social Science Frontiers Series, No. 2). New York: Russell Sage Foundation, 1969.

The author expresses concern over the dangers that might occur if the initial and somewhat confused enthusiasm with social indicators is allowed to motivate promises of social accounting systems before such promises can be fulfilled. He thus is concerned with the steps that should be taken so that initial enthusiasm is not dampened and there is a "strengthening of commitment" among those who are called upon to do the work. Five "steps" are thought to be either the wrong ones to take or to have the lowest priority. These are (1) developing social accounts systems; (2) construction of composite indexes; (3) deciding what types of measures ought to be included in social reports; (4) deciding which agency should be responsible for publishing which social report; and (5) use of social indicators to evaluate social programs. The author considers the problem of measuring social change as the most immediate task to be performed. The positions of the "theorist" and the "inductivist" on this measurement issue are presented with the author opting for the latter approach on pragmatic grounds. He most strongly supports an approach to indicator development that combines the use of existing data with those that are newly collected. This approach is termed "replication of base-line studies," and it is pointed out that this approach (1) should have the greatest marginal return for a given input of resources and (2) should be encouraged since it is the strategy least likely to be adopted in the ordinary course of events. Examples of replication studies and guidelines for conducting such studies are presented. (G)

Dunn, E.S. The national data bank movement in the United States. Proceedings of the Business and Economic Statistics Section of the American Statistical Association. Washington, D.C.: American Statistical Association, 1973.

This article is a critical review of the national data bank movement in the United States. It considers the Ruggles Committee Report, the Dunn Report, and the Kaysen Committee Report. The author points out that, at present, this movement is not making progress. He argues that both the data bank movement and the currently popular social indicators movement have not, in their interest in statistical reform, considered the issues of statistical system design. According to the author, proponents of both these movements believe that information problems can be solved by reapplying extant procedures to a wider range of needs and problems with more efficiency. He argues that this belief is questionable and that statistical reform must be conceived of in a broader fashion. (G) van Dusen, R.A. (Ed.). *Social Indicators 1973: A review symposium*. Washington, D.C.: Social Science Research Council Center for Coordination of Research on Social Indicators, 1974.

Following the publication of Social Indicators 1973, an international review symposium met to discuss and evaluate the potential utility of the document. The chapters in this book present the essence of the commentary at the symposium. Chapter 1 identifies the themes in the symposium discussions and provides an overview of the proceedings. Chapters 2 and 3 place Social Indicators 1973 in the context of the national social indicator reports of Sweden, Norway, France, England, and West Germany. Chapter 4, by Stephen Fienberg and Leo Goodman, is especially recommended as additional reading; the chapter reviews statistical and methodological problems and procedures in preparing social indicator reports. (R/G)

Educational Policy Research Center. *Toward master social indicators* (SRI project 6747, Research Memorandum EPRC-6747-2). Menlo Park, Calif.: Stanford Research Institute, 1969.

Key considerations in the development of a comprehensive national social data system are described. Processes for aggregating low-level indicators into composite indicators ("master indicators") are proposed. The authors present tables of attainment categories, subcategories, and possible indicators for each of seven areas related to the individual and society. (G)

Gross, B.M., & Straussman, J.D. The social indicators movement. *Social Policy*, 1974, *5*(3), 43-54.

The authors examine different foci, cross-currents, and future orientations of the social indicators movement that are the result of heterogeneous interests and needs. Foci are shown to range from the simple collection or analysis of social information to the articulation of social goals, the preparation of social reports, and the development of social accounts. The cross-currents include noneconomist professionalism, broadband economism, humanism, statisticism, conceptualism, radicalism, and managerialism. The future orientations point toward a more tightly managed corporate society, on the one hand, and a more humanist, democratic, egalitarian postindustrialism, on the other. Examination of these elements of the indicators movement is made from both historical and political perspectives. (G)

Gross, B.M. (Ed.). *Social intelligence for America's future: Explorations in societal problems*. Boston: Allyn and Bacon, 1969.

The chapters in this book are the reorganized and slightly revised articles previously published in two volumes of *The Annals of the American Academy of Political and Social Science* (371 and 373, May and September, 1967) with Bertram Gross as Special Editor. In these chapters, a varied group of scholars, government officials, and journalists explore what is--or what they think should be--going on in a wide variety of specialized fields. One of the purposes of this collection, apart from probing the particular content areas, is to illuminate the variety of approaches to social indicators and goals. The 20 chapters were written by ten sociologists, five political scientists, three journalists, three economists, one law professor, and one physician. (G)

Gross, B.M. The state of the nation: Social systems accounting. In R.A. Bauer (Ed.), Social indicators. Cambridge, Mass.: M.I.T. Press, 1966.

In this chapter, a general model for an international system of national social accounts is presented. The model integrates relevant concepts developed by economists, political scientists, sociologists, anthropologists, psychologists, and social psychologists. According to the model, the state of any nation at any period of time can be analyzed in terms of two interrelated, multidimensional elements: system structure and system performance. This system of accounts is intended to be descriptive rather than explicitly explanatory, although it is hoped such a descriptive system will form the basis for explanation. A full system of national social accounting thus supplies the concepts needed to (1) structure information on the past or present; (2) formulate goals; and (3) establish criteria for evaluation. More generally, it is the author's view that such a system is a conceptual system through which people try to represent concrete systems. General structural elements identified include (1) differentiated subsystems, (2) internal relations, and (3) external relations. General performance elements identified include (1) acquisition of inputs, (2) production of outputs for external use, and (3) investments made in the system. Structural and performance elements of the model are broken down further into 20 and 21 more specific elements, respectively, and examples relevant to organizations and nations are presented. The author concludes by setting out some of the problems that will likely be encountered in developing social indicators, but stresses the usefulness of working from a comprehensive system description to development of indicators for particular subsystems. (G)

Henderson, D.W. Social indicators: A rationale and research framework. Ottawa: Information Canada, 1974.

In contrast to approaches which rely heavily on statistical techniques to determine weights for components of composite indices, the author of this study relies primarily on inferences from theory and other conceptual methods. Henderson hypothesizes quality of lifegoal areas and social trends likely to have the greatest influence in shaping the future of Canadian society were identified. He then examines the goal areas in relation to the social trends in order to identify key areas of concern--those in which the greatest changes or perturbations will occur and, hence, the greatest need for societal action will arise. These theoretically derived areas of greatest need are then assigned relative weights reflecting their projected seriousness for Canadian society. Finally, Henderson identifies indicators for the need areas and applies these relative weights in forming composite indices made up of the indicators for different goal areas.

Johnston, D.F. National social indicator reports: Some comparisons and prospects. Washington, D.C.: General Assembly of the World Future Society, 1975. (ERIC Document Reproduction Service No. 109014).

This report provides comparisons among the social indicator reports of seven countries: Canada, France, Great Britain, Japan, Norway, the United States, and West Germany. The purpose of social indicator research in each country is to provide a means for developing more adequate answers to questions concerning present and emerging social trends. Limitations of the social indicator reports are that the data are purely descriptive of broadly aggregated trends and can provide only a general perspective of the emerging trends. The appendix is a comparison chart of social-concern coverage reports of the seven countries in areas of social concern including population characteristics; family characteristics; housing and community characteristics; social welfare and security of the population; health and nutrition; public safety and legal justice; education and training; work; income, wealth, and expenditures; leisure, recreation, and cultural activity; social mobility and social participation; and miscellaneous areas. (ERIC)

Land, K.C. Theories, models, and indicators of social change. *International Social Science Journal*, 1975, *27*, 7-37.

The author reviews the history of the social indicators movement from its inception in the 1960s in the United States and describes the major contributions to the field. Five definitions of social indicators and problems with those definitions are presented, and the author reviews his own alternative definition and conceptual framework. Land's general framework for development of social indicators, which classifies indicators as being policy instrument descriptive indicators, nonmanipulable descriptive indicators, social system analytic indicators, output end-product descriptive indicators, second-order impact analytic indicators, or side-effect descriptive indicators, is used to illustrate the shortcomings of traditional social system model-building procedures. The author discusses how social indicators can be validated externally either by a social policy criterion or by a social change criterion, and he differentiates between two types of macro-sociological time series social indicator models, those concerned with the aggregate level of well-being and those concerned with equity. An alternative kind of model based on individual-level data (sociological life-cycle social indicator models) is described. (G)

Moore, W.E., & Sheldon, E.B. Monitoring social change: A conceptual and programmatic statement. *Social statistics proceedings of the American Statistical Association*. Washington, D.C.: American Statistical Association, 1965.

The authors discuss the monitoring of large-scale structural transformations in American society, the trends of these changes, and how public policy does and could affect those trends. Five major areas are suggested for monitoring: the demographic base, major structural components, distributive features, aggregative features, and welfare. (G)

Morss, E.R. The revolutionary and the marginal-positivist: Does the social indicators movement open up a new possibility for dialogue? *Social Indicators Research*, 1974, *1*(2), 229-242.

The author argues that a deep schism exists within the social sciences between the "marginal-positivist," who feels meaningful change can be made through marginal steps in our social systems, and the "revolutionary," who feels fundamental alterations are needed before our systems will work for the betterment of mankind. This essay asks whether social indicators are compatible with the methodologies of each group, and if so, whether they offer a new possibility for a fruitful dialogue. The author notes that the revolutionary would benefit from engaging in the social indicator movement, since he or she would be forced to specify his/her goals concretely, measure progress toward these goals, and consider alternative approaches to achieving the goals. The marginal-positivist, on the other hand, would benefit from such engagement in that working with social indicators would cause him or her to adopt a broader focus on societal problems. Since, in the author's opinion, persons holding either the revolutionary or marginal-positivist perspectives will benefit from involvement in the social indicators movement, he concludes that social indicators offer hope for constructive dialogue between persons holding these two perspectives. (G) de Neufville, J. Social indicators and public policy: Interactive processes of design and application. New York: Elsevier North Holland, 1975.

This book is about quantative measures and their role in public decision-making. It addresses the twin questions of how to design indicators that can be useful to policy and how to design processes to make better use of such information.

de Neufville bases the analysis to these questions on the notion that there can be no meaningful measure without a theory and/or a hypothesis, at least. She contends that the intended purpose of making a measurement, therefore, has to play a role in the process of designing it and that the design process itself has to become part of a political process. If an indicator is to have a continuous and trusted meaning, its concepts and methods require some institutionalization. In addition, attention must be given to the practical constraints of data collection methods, which will partially determine the concept ultimately measured, and to subtle distinctions in structuring the data for presentation.

Specifically, the author discusses the role of quantitative measures in the first critical step of public policy, problem definition; the setting and context for future systems of indicator production and use in U.S. statistical policy; the problems and constraints on creating concepts; the criteria for choosing among data collection processes and recognizing how they may change concepts; choices for structuring data and their implications; ways of institutionalizing indicator production and creating public acceptance; the range of uses, from high-level public discussion of goals and policy to criteria for the allocation of program funds, and the effects of letting data become manipulable for short-term political considerations. The discussion draws on three major cases, the unemployment rate, the standard budget, and the crime rate, and illustrates how technicians, politicians, and the public can use more information to aid processes of public choice.

Sheldon, E.B., & Land, K.C. Social reporting for the 1970s: A review and programmatic statement. Policy Sciences, 1972, 3(2), 137-151.

The article reviews the state-of-the-art of social indicators research. The authors state that the interest in social measures of this type is due largely to the demand for information relevant to (1) policymaking, (2) monitoring the well-being of society, and (3) modeling aspects of the social system. The distinction between objective and subjective measures of the quality of life is discussed, and the fact that the definition and measurement of well-being requires a comparative perspective is noted. Elements that play a key role in linking social measurements to social policies are delineated, as are three criteria for the selection of areas to be measured or of particular measures themselves. The authors review the work that has been accomplished in developing social indicators in the areas of public safety, legal justice, and youth. They then present several recommendations that would extend work in these and other areas of social concern. Among these recommendations are (1) a research and development strategy; (2) an organizational structure for the conduct of social indicators research; and (3) coordinating mechanisms that will monitor and coordinate activities, both within and outside of government. (G)

Sheldon, E.B., & Moore, W.E. (Eds.). Indicators of social change: Concepts and measurements. New York: Russell Sage Foundation, 1968.

This volume focuses on the theoretical and practical concerns of measuring large-scale structural change in the country. The chapters, by a variety of authors, discuss the major component parts of our society. The 13 content-specific chapters are categorized into four areas: (1) the demographic base, giving an indication of aggregative population trends and their changing composition and distribution across the nation's surface, (2) major structural components of the society, examining the ways in which our society produces goods, organizes its knowledge and technology, reproduces itself, and maintains order, (3) distributive features of the society, looking at how the products of the society are allocated across the American population, and (4) aggregative features of the society, the ways in which the system as a whole changes with respect to its inequalities, variable opportunities, and social welfare. (G)

Sheldon, E.B., & Parke, R. Social indicators: Social science researchers are developing concepts and measures of change in society. Science, 1975, 188, 693-699.

This article reviews significant milestones and products associated with the "social indicators movement." Four areas of activity are highlighted: (1) statistical time series to measure social change, (2) evaluation research and social experimentation, (3) net national welfare measurement, and (4) national goals accounting. While the authors review recent attempts at improving the data bases in these areas, they warn that attempts to use social indicators in social accounting, social engineering, or evaluation efforts may be misguided. They conclude that the development and analysis of descriptive time series and the modeling of social processes are the most promising approaches to describing the state of society. (G)

Taeuber, C. (Ed.). America in the 70s: Some social indicators. Annals of the American Academy of Political and Social Science, Vol. 435, 1978.

This issue of The Annals was prepared under the special editorship of Conrad Taeuber. It is a collection of interpretive essays based on individual chapters of Social Indicators 1976. In addition to presenting interpretation of the data included in Social Indicators 1976, the authors offered comments and criticisms concerning the volume. While Social Indicators 1976 was regarded, generally, as an informative compilation of statistical data, concerns were noted for the lack of data in certain areas, the absence of cautionary remarks regarding data quality, and the lack of attention to prominent social issues in organizing the data for dissemination. Two articles are especially relevant to the preparation of social indicator reports. In "Social Indicators '76 and Perspective Canada II: Elixirs of Reason or of Sleep?" David Brusegard, chief of the social indicator unit of Statistics Canada, makes a brief comparison between the American and Canadian chartbooks. Brusegard concludes that neither volume was entirely successful in developing social indicators or in providing a social report. He argues that such efforts must, in the future, involve authors from outside the government if they are to be more successful. In "Postlude: Past, Present, and Future," Denis Johnston, editor of Social Indicators 1976, discusses prospects for the future in the areas of cooperative international efforts, improving the data base, constructing "counter indicators," providing projections and explanatory measures, and broadening the audience for social indicator reports. (R/G)

United States Department of Commerce, Office of Federal Statistical Policy and Standards and Bureau of the Census. Social indicators 1976: Selected data on social conditions and trends in the United States. Washington, D.C.: U.S. Government Printing Office, 1977.

This volume is the sequel to Social Indicators 1973. It is a comprehensive collection of statistical data, presented in graphic form and descriptive of current social conditions in the United States. Eleven major social areas are examined in eleven separate chapters: Population; the family; housing; social security and welfare; health and nutrition; public safety; education and training; work; income, wealth, and expenditures; culture, leisure, and use of time; and social mobility and participation. Within each of those subject areas, certain topics of broad social interest - social concerns - are identified and treated in separate sections. In addition, international comparisons are made and further readings are suggested after each chapter.

Three broad types of indicators are distinguished: indicators of system performance, indicators of well-being, and indicators of public perceptions. The emphasis is on the latter two, that is, indicators which measure individual or family well-being and reflect results or outcomes rather than inputs of resources. The majority of the indicators are disaggregated according to a variety of background characteristics in order to reveal the relative position of different population groups with respect to the variable of interest. The disaggregations shown most frequently include race, age, sex, occupation, educational attainment or family income.

The statistical data in this report come from a wide variety of sources. These are listed in the tables which follow the graphs. In addition, brief summaries of each chapter as a whole are provided, drawing attention to the highlights of the data presented. The report refrains from lengthy interpretations of the data, due to their descriptive character, and instead refers the reader for more authoritative interpretations to Taeuber, C. (Ed.) (see reference). A 1980 report is in preparation.

United States Department of Health, Education, and Welfare. Toward a social report. Washington, D.C.: U.S. Government Printing Office, 1969.

The title of this volume was chosen to indicate that it is not a social report, but rather a step in the direction of a social report and the development of a comprehensive set of social indicators. What is known about progress toward generally accepted goals is presented for several areas: health, social mobility, the physical environment, income and poverty, public order and safety, and learning, science, and art. There is also a chapter on participation in social institutions, but because of the lack of relevant indicators in this area, it aspires to do no more than pose important questions. (G)

Zapf, W. Systems of social indicators: Current approaches and problems. International Social Science Journal, 1975, 27, 479-498.

Ten examples of operational social indicator systems from various countries are described. For each system, the following seven aspects are specified: (1) research objective, (2) system, (3) method of selection and weighting, (4) goal areas or life domains, (5) type and number of indicators, (6) data base from which the indicators were constructed, and (7) topics. With the aid of the examples, some general problems are discussed: (1) the functions of social reporting (measurement, evaluation, accounting, explanation, and innovation), (2) the nature of social indicators, and (3) the levels of analysis and components of welfare that enter into the analysis of welfare. The author concludes with a description of the SPES Project financed by the German Research Association and being carried out by the Social Policy Research Group of Frankfurt/Mannheim. (G)

SOCIAL INDICATORS: THEORETICAL

Baumheier, E.C., Oborn, P.T., Conner, L.I., Slaughter, E.L., & Cook, C.L. *Toward a comprehensive data bank for social indicators*. Denver: Denver University, Center for Social Research and Development, 1975. (NTIS No. SHR-0000523)

A conceptual framework defining a set of social indicators is presented that could be used to measure status as well as change in several areas of social concern. A composite list of social concerns drawn from the social indicators literature is discussed, and operational definitions are developed and compared to data presented in the Social Indicators Project of the University of Denver's Center for Social Research and Development in order to identify content gaps and to fix the limits of social indicators collection. The proposed comprehensive indicators system is designed to monitor change in quality of life with respect to economic, political, social, cultural, and environmental components. The data system is designed to handle information collected at the county level, but it could be disaggregated to the community or aggregated to the state level without presenting serious problems. It is pointed out that, although a comprehensive indicator system at the county level would present some practical difficulties in data collection, the system would provide benefits to county-level planners as well as to state and federal decisionmakers because it calls attention to change in all the domains of human experience. An appendix describes the Social Indicators Project and contains a bibliography. (NTIS)

Brand, J. The politics of social indicators. *British Journal of Sociology*, 1975, *26*(1), 78-90.

The author discusses the development of social indicators in terms of their relation to policy goals and their use by political organizations. In constructing indicators, the link between them and policy goals is often unclear because policy goals are not explicit. In addition, goals change over time, and indicators may not be relevant to the changed policies. Social indicators may be used by political organizations to vindicate their policies or as political weapons against opponents. (PSYCH ABS)

Campbell, A., & Converse, P.E. (Eds.). *The human meaning of social change*. New York: Russell Sage Foundation, 1972.

This book was commissioned by the Russell Sage Foundation as a companion piece to *Indicators of Social Change* (Moore & Sheldon, 1968). Whereas Moore and Sheldon were concerned with various kinds of hard data, typically sociostructural, this book is devoted chiefly to so-called softer data of a more social-psycholocial sort: attitudes, expectations, aspirations, and values. The purpose was to set forth a statement of the most significant dimensions of psychological change, a review of the state of information regarding them, and a projection of the measurements needed to improve understanding of these changes in the future. Topics include community, family and kinship, work, leisure, the American electorate, and Negro population, the criminal justice systems, and alienation. (G)

Fox, K.A. *Social indicators and social theory*. New York: John Wiley and Sons, 1974.

The author proposes a system of social accounts and indicators, drawing on concepts from sociology, economics, and ecological psychology. Theoretical models are proposed that combine economic and noneconomic variables and are applied at the national and community levels and to higher education and earnings as a function of occupation. The author discusses some illustrative models of a world economy and the manner in which economic policies adopted by one nation affect prices and incomes in other nations. The history of the development of econometrics is summarized and compared to the situation in social indicators and models. (G)

Garn, H.A. Models for indicator development: A framework for policy analysis. Washington, D.C.: Urban Institute, 1976. (ERIC Document Reproduction Service No. ED 123 780)

This document summarizes aspects of a current approach to social indicator research and related problems in policy analysis generated by an interest in isolating major sources of variability in the generation of human welfare and developing indicators associated with welfare-generating processes. A set of models being developed for indicator research is described, and some of their implications explored. Suggestions are made for assessing performance from both an institutional perspective and a social perspective. The first section considers sources of variability in welfare generation that can be traced to the processes of transforming resources into welfare outcomes through production or consumption activities. The second section discusses extending the models to include sources of variability arising from the institutional settings in which these activities occur. The third section illustrates implications of these models for identifying the information requirements of the client and service providers of a prototypical public school system. (ERIC)

Land, K.C., & Spilerman, S. (Eds.). Social indicator models. New York: Russell Sage Foundation, 1975.

The chapters in this book are the product of a conference on Social Indicators Models held in 1972 at the Russell Sage Foundation. They are divided into two major groups: 1) replication models built on the basis of data from repeated cross-sectional sample surveys; and 2) longitudinal and dynamic models based on repeated observations of the same individuals or structural units.

Although the chapters deal with a variety of topics, there are similarities. First, each chapter addresses a specific set of social indicator data and constructs a corresponding analytical model with which to assay the various components of changes in the indicators. Second, they refrain from developing theoretical models which are too broad for direct practical purposes. In addition, they place emphasis on the analysis of social change and the interrelationships among social indicators for the purpose of improving social reporting and the guidance of social policy.

The chapter by Spilerman on "Forecasting Social Events" focuses on several conceptual issues in model construction and forecasting social indicators. In particular, he discusses some conditions under which the forecasting of social variables is exceedingly difficult.

Laszlo, C.A., Levine, M.D., & Milsum, J.H. A general systems framework for social systems. Behavioral Science, 1974, 19(2), 79-92.

In this paper, the relationship between general systems theory and social systems is explored, including an introduction to the general system characteristics that are basic to all systems. The basic dynamic properties of systems are described in terms of time lags or inertia, time delays, positive feedback or growth, negative feedback or homeostasis, stability, and thresholds. Building on these basic concepts, the authors describe control systems, optimization and performance criteria, and complex and hierarchical systems. Emphasis is placed on the discussion of social indicators and social accounts in the social theoretic context. (G)

Maloney, J.F. (Chair). Progress in development of social indicators. Symposium presented at the Twenty-Eighth Annual Conference on Public Opinion Research. Public Opinion Quarterly, 1973, 37(3), 423-487.

These papers were presented: N. Zill and R. Parke, Social Science Research Council, Center for Coordination of Research on Social Indicators; "From Self-Report to Social Report: Uses of Survey Data in Social Indicators"--the social indicators' potential of existing survey and poll archives has yet to be adequately exploited, and therefore the SSRC Center for Coordination of Research on Social Indicators is working to improve the utilization of survey data. J.P. Robinson, Survey Research Center, University of Michigan; "On the Correspondence between Subjective and Objective Social Indicators"--several hypotheses were discussed to explain the lack of correspondence often found between people's subjective evaluation of their quality of life and their objective behaviors. J.R. Goeke, Opinion Research Corporation; "Three Decades of Experience with Social Indicators: Are They Useful in Forecasting?"--six classes of indicators were discussed that have been very predictive but are largely ignored. (G)

McIntosh, W.A., Klonglan, G.E., & Wilcox, L.D. Theoretical issues and social indicators: A societal process approach. Policy Sciences, 1977, 8(3), 245-267.

Well-being involves various levels: the individual, the institutional-distributive, and the societal. These levels are interrelated. Social indicators of well-being must be theoretically based in such a way as to take into account these levels. A societal process model is proposed to describe the levels of society and the nature of well-being at each level. Example social indicators are provided regarding the output and distribution of well-being, the effect of policy manipulable and nonmanipulable inputs, and the secondary consequences of inputs. The author suggests four benefits of using a societal process model. (1) The state of the nation in the fullest sense could be monitored and assessed. (2) The effects of certain changes in the societal environment could be traced through the entire system, in order to ascertain the type and degree of change and adjustment necessary for the nation to readjust to the new environmental conditions. (3) A societal process model would allow one to ascertain the short- and long-term effects of major societal policies on the individuals, institutions, values, and physical environment of a nation. (4) Intersectorial policymaking and planning would be facilitated if a societal process model were fully operationalized and in use. (G)

Newfield, J.W., & Duet, C.P. Implications of quality of life for goal setting tasks of curriculum workers. Education, 1976, 97(2), 126-135.

The authors identify a trend in the social sciences toward providing the public with information that can be used for a variety of policy determination tasks. The term "social indicators" is used to describe various characteristics intended for these social reports. Indexes of quality of life, a popular media description of some social indicators, represent a multidisciplinary summary of characteristics people value. As such, they offer a unique resource to the curriculum worker concerned with the task of goal identification. As an example of the use of this resource, a survey of characteristics listed in quality of life indexes was made. This list was then compared with the goals of American education as formulated by several major commissions. In general, most of the traditional aims of education were reiterated in the indexes, indicating that quality of life indexes are a potentially useful resource for the curriculum worker. Some possibilities for new directions in aims of education are proposed. (PSYCH ABS)

Organization for Economic Co-operation and Development. Measuring social well-being: A progress report on the development of social indicators. Washington, D.C.: OECD Publications Center, 1976.

This report summarizes the effort of the OECD since 1973 to develop a comprehensive set of social indicators which can be used to "better focus and enlighten public discussion and decision-making" (p. 157) as well as improve social reporting and social analysis. It describes the extent of consensus among member countries as to the indicators which are currently available and those which have to be developed and implemented in ways that will permit member countries to share information on the progress they are making in achieving their own social goals.

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The report is divided into five parts. Part I reviews the working methods and the approach of the OECD to indicator development. Part II describes guidelines for the development of social indicators while Part III provides a brief list of social concerns and social indicators. Part IV further specifies the contents of the social concerns and sub-concerns and discusses and lists the corresponding indicators. The areas of social concern discussed are: health, individual development through learning, employment and the quality of working life, time and leisure, personal economic situation, physical environment, the social environment, personal economic situation, physical environment, the social environment, personal safety and the administration of justice, and social opportunity and participation. Part V discusses the potential uses of social indicators. In addition, two appendixes present this list of concerns and examine the existing availability of data required by the proposed indicators.

list

As an illustration of the general approach taken by the OECD study, the area of social concern "individual development through learning" is broken down into lists of concerns, sub-concerns, and sub-sub-concerns which in turn are translated into social indicators, that is educational results which can be statistically monitored.

Pampel, F.C., Land, K.C., & Felson, M.E. A social indicator model of changes in the occupational structure of the United States: 1947-74. American Sociological Review, 1977, 42(6), 951-964.

This paper presents a 10-equation dynamic structural equation model that shows how changes in the occupational structure of the United States affect each other and are affected by economic, technological, and institutional conditions. The model postulates a recursive flow of causation (no explicit feedback relationships) from changes in sectorial (agricultural, manufacturing, services) demand and productivity to changes in the distribution of occupation by sector, bureaucratization, and status level. Application of the model to data from past years (1947 to 1972) allows conditional forecasts to be made and validated against new data. The equations fit the observed data well, lack demonstrable autocorrelation of disturbances, and forecast the 1973 and 1974 values with considerable accuracy. While changes in sectorial demand and productive efficiency were substantial during the 1947-1972 period, the rates of change in these driving variables of the model have decreased in the 1970s. If these rates of change continue to decline, then the model leads to the prediction that there will be a contraction in the rate of growth of high status jobs, which in turn implies a decline in the rate of upward occupational mobility in the absence of other counterbalancing structural changes. (G)

Parke, R., & Seidman, D. Social indicators and social reporting. In C. Taeuber (Ed.), Science in the 70s: Some social indicators. *Annals of the American Academy of Political and Social Science*, 1978, 435 (January), 1-22.

Doubts about the easy equation of economic growth and social progress in the 1960s, led to renewed interest in social measurement and to the birth of the "social indicators movement." Social Indicators, 1976, (US Office of Management & Budget), a product of that interest, can be read as both a report on social conditions and trends in the US and as a progress report on social indicators research. The volume is best understood against the background of the social indicators movement and of the research it has stimulated. Several research traditions are joined together in the social indicators movement, but they share a concern for measurement, analysis, and the reporting to a general audience of aspects of social conditions. The tradition best reflected in Social Indicators, 1976 stresses monitoring and reporting social change. Research in this tradition emphasizes conceptual and methodological development of measures, improvements in available data bases, development of social indicator models, and social reporting. In its data selection, treatment of data, organization, and commentary, Social Indicators, 1976, is an improvement over Social Indicators, 1973, though its analysis is notably insufficient. Most of the improvements which should be found in future editions depend upon continued progress in the development of social indicators. 3 Tables, 3 Charts. (SOCIOL AB)

Rosove, P.E. *A trend impact matrix for societal impact assessment* (Monograph 5). Los Angeles. USC, Center for Futures Research, 1973.

This paper suggests a logical approach to analyzing societal trends and presenting these to policy makers. It is built on the assumption that a data storage and display system is needed to facilitate open discussion among planners, policy makers, researchers, and the general public. The author offers and discusses examples of trend impact matrices for the analysis of criminal justice roles and education and training requirements.

Raynauld, A. Social indicators: The need for a broader socioeconomic framework. *Canadian Public Administration*, 1975, *18*, 99-103.

The author describes the general approach followed by the Economic Council of Canada in developing variables in models of various aspects of the social system. From the Council's point of view, society is seen as having the basic goals of well-being and equity; all other objectives are assumed to be contributory to these two primary goals. The social system is divided into various areas of concern, corresponding to existing institutional realities. The social indicator framework employed reflects the full array of outputs and related inputs for each area. The area of education is provided as an example of one of the ways in which the Council has approached the development of social indicators. (G)

Shonfield, A., & Shaw, S. (Eds.). *Social indicators and social policy*. London: Heinemann Educational Books, 1972.

The essays in this book are the contributions made by the European scholars to the discussion at the joint conference of the British and American Social Science Research Councils (SSRC) at Ditchley in 1971. The editors describe them as "work in progress" which illustrate some of the conceptual and statistical problems which arise in the construction of social indicators. The book concentrates on three topics: measurement of crime, health, and education.

In addition, brief discussions of the historical development of social indicators, their typology and conceptual structure as well as their use (market) are included.

An underlying theme of the collection is the question of what the minimum of social theory is that is necessary to advance towards an improved measurement of social welfare. There is expressed concern that indicators might become vindicators, that is, a means of giving an objective appearance to subjective value judgments. Furthermore, there is general agreement that the information provided by present national statistical data is inadequate and needs to be refined.

The article by M.A. King on "Primary and Secondary Indicators of Education" is a point in case. King contends that many of the educational statistics "are in the form of figures relating to stocks rather than flows" (p. 53). They provide figures, e.g., on the number of students in different educational establishments but little information about where they come from or where they go to. Using a model which identifies 17 different categories of educational stages in an individual's life, King presents and discusses a matrix for males in England and Wales for the year 1966 which shows the flows of individuals between the different stages of the system in a given time period.

Sismondo, S. Social indicators for policy research and democratic action: A paradigm and some examples (Report 73-119.). New York: Joint Meeting of the American Sociological Association and the Rural Sociological Society, 1973. (ERIC Document Reproduction Service No. ED 082 908)

The primary purpose of this paper is to present a possible means to establish a new social indicators intelligence system that embodies a relations testing capacity. Major ideas defined and described include social indicators, theory, model, policy research, and democratic action. A paradigm covers the movement from theory to model and action. Three examples are used to show the inference from model to reality. It was noted that a system for the construction, collection, and analysis of social indicators should not be isolated from other intellectual and political endeavors. It is argued that a single best utilization of social indicators research exists within the policy research and analysis domain that will respect the functioning of the democratic system. (ERIC)

SOCIAL INDICATORS: METHODS

Anderson, J.G. Causal models and social indicators: Toward the development of social systems models. American Sociological Review, 1973, 38(3), 285-301.

James Anderson describes his attempt to use structural equation modeling techniques to develop a model of the health care system in the state of New Mexico. The model that is derived specifies hypothesized cause-and-effect relationships between social, demographic, and economic time series. Of particular interest is the suggestion that structural equations models of this type can be used to project the likely consequences of possible state and federal actions designed to affect health care delivery. This article provides a good introduction to more recent work in structural equation modeling of time series (for example, Land, K.C., & Felson, M.E. A general framework for building dynamic macro social indicator models: Including an analysis of changes in crime rates and police expenditures. American Journal of Sociology, 1976, 82, 565-604; and Anderson, J.G. Causal models in educational research: nonrecursive models. American Educational Research Journal, 1978, 15(1), 81-97.) (R/G)

Andrews, F.M., & Crandall, R. The validity of measures of self-reported well-being. Social Indicators Research, 1976, 3(1), 1-19.

Using a new analytic approach, construct validity estimates were developed for proposed social indicators of self-reported well-being. Two separate investigations are reported: the first involved data on six aspects of well-being each assessed by six methods from 222 adults in one geographic area; the second, a partial replication and extension, involved a more limited set of indicators measured on a sample of 1,297 respondents representative of all American adults. The results provide evidence that perceptions of well-being can be measured by single questionnaire or interview items using any of four formats with validities in the range of 0.7 to 0.8 (implying that roughly half to two-thirds of the variance is valid) and with correlated method effects contributing less than 10% of the total variance. Two other formats, however, were markedly less valid. These findings are important in view of part criticisms of "subjective" social indicators as lacking in validity, and the findings can guide current efforts to develop new ways to assess the quality of life. Methodologically, the article illustrates the feasibility and utility of deriving parameter estimates of structural equation models of multimethod-multitrait data using Joreskog's LISREL algorithm. The possibility of deriving validity estimates in this way, even when the data include correlated errors, opens new and important oppotunities to precisely assess the amount of error variance in much social science data. (G)

Bennett, K.F., & Blackburn, R.T. Social indicators of institutional commitment. Journal of Industrial Teacher Education, 1975, 13, 48-52.

The paper describes how five indicators were developed to measure the comparative degree of commitment of a group of community colleges to their vocational-technical areas. The criteria of a "good" measure are developed, the findings of a pilot study are displayed, the indicators are critiqued, and alternatives are suggested. (G)

Box, G.E.P., & Jenkins, G.M. Time-series analysis: Forecasting and control. San Francisco: Holden Day, 1970.

The book is concerned with the building of models for discrete time-series and dynamic systems. It describes in detail how such models may be used to obtain optimal forecasts and optimal control action. All the techniques are illustrated with examples using economic and industrial data. In Part I, models for stationary and nonstationary time-series are introduced, and their use in forecasting is discussed and exemplified. Part II is devoted to model building and procedures for model identification, estimation, and checking, which are then applied to the forecasting of seasonal time-series. Part III is concerned with the building of transfer function models relating the input and output of a dynamic system computed by noise. In Part IV, it is shown how transfer function and time-series models may be used to design optimal feedback and feedforward control schemes. Part V contains an outline of computer programs useful in making the needed calculations and also includes charts and tables of value in identifying the models. (G)

D'Agostino, R.B. Social indicators: A statistician's overview. Social Indicators Research, 1975, 1, 459-484.

In this article, the problem areas of social indicator research that are of concern to the statistician are considered. Among these are the purposes of social indicators, what social variables should be considered as conceivable variables related to quality of life, what data should be collected (taking into account the difficulty of not being able to directly measure variables of interest), how one collects the data (which is usually in the form of a time series) guarding against multicollinearity, and how the collected data should be handled and analyzed. The author discusses why in social indicator research, the secular trends, cyclical movements, seasonal variations, and irregular fluctuations must be taken into account. Techniques are discussed for relating lead indicators in one time period to coincident indicators in another period. Finally, a select bibliography is presented on canonical correlation, forecasting, indicators and index numbers, path analysis, regression analysis, simulation techniques, time series analysis, and other areas useful in analyzing social indicator data. (G)

Firestone, J.M. The development of social indicators from content analysis of social documents. Policy Sciences, 1972, 3(2), 249-263.

The author distinguishes his conception of social indicators (that they should be indicators of theoretically central concepts) from the view held by Marcus Olson and others (that social indicators should be indicators of normatively central concepts). Five types of theoretical concepts that social indicators should assess are presented. These include (1) the physical movements of goods, services, and communications viewed from a social exchange or directed action perspective (i.e., transactions); (2) the noncultural products of past transactions that provide part of the context of ongoing transactions; (3) the documentary products of past transactions, art, film, media records, literary products, political communications, and other documents that provide another portion of the context of transactions; (4) the relational configuration of psychological states of individual members of a social system; and (5) the physical characteristics related to transactions (e.g., land use patterns, climate). Five data types are associated with each of these theoretical concepts: (1) interview response data, (2) institutional records, (3) artifactual data, (4) simple observation, and (5) contrived observation. The author shows that little effort has been made to use artifactual data to assess cultural products and group psychological states. A review of the literature is summarized that suggests sizable crosstemporal correlations may be found between indicators of national motives derived from content analysis of school texts and various national social (condition) indicators. The author argues that researchers should turn away from survey research as a tool for generalizing analyses of society. Instead, more effort should be made to analyze literature, art, film, songs, and so on in developing social indicators. (G)

Glass, G.V., Willson, V.L., & Gottman, J.M. Design and analysis of time-series experiments. Boulder, Colorado: Colorado Associated University Press, 1975.

This work is an attempt at an integrated treatment of the methodological developments related to time-series experimental design during 1966-1974. Subjects include time-series experiments and the investigation of causal claims, variations on the basic time-series experimental design, estimating and testing intervention effects, sources of invalidity in time-series experiments, concomitant variation in time-series experiments, and spectral analysis of time-series. The book is a technical treatment that builds on the work of G.E.P. Box and J.M. Jenkins, Time-series analysis: Forecasting and control, 1970. (G)

Hastings, P.K. (Ed.). Survey data for trend analysis. Washington, D.C.: Social Science Research Council, Center for Coordination of Research on Social Indicators, 1974.

This book is an index to all questions asked in two or more years in the American national survey holdings of the Roper Public Opinion Research Center. Each entry consists of the question wording, the survey organization that asked the question, the number and date of the survey, and the number of the question. The same information is provided for variant wordings of the question. The index provides sufficient information to permit quick identification of survey data items likely to be useful in constructing time series. As an aid to researchers undertaking secondary analysis of survey data, a short guide to survey archive research is included. (G)

Hauser, P.M. Social statistics in use. New York: Russell Sage Foundation, 1975.

The purpose of this book is to provide the educated lay reader with information on how statistics, especially those collected and compiled by government, are used, and in so doing to show justification for the census, government surveys, and other statistical undertakings that require public cooperation. The focus is mainly on social, as distinguished from economic, statistics, although the boundary line is not always clear and the statistics examined often have both social and economic implications. A number of experts were asked to prepare memoranda on the nature and uses of data in their fields of specialization, and the memoranda were then edited and rewritten into a nontechnical and uniform style by the author. The book is divided into chapters on thirteen content areas as well as chapters on the need for statistics, on public opinion polls, and on social indicators. (G)

Hellwig, Z. A method for the selection of a "compact" set of variables. Part II of *Social indicators: Problems of definition and of selection* (No. 30, Reports and Papers in the Social Sciences). Paris: UNESCO Press, 1974.

This article describes the Wroclaw Taxonomic Method and applies the method to the measurement of the progress being made by developing nations based on sociological and economic indicators. Weights for indicators that describe particular aspects of development status are determined by the "distance" of individual indicators from one another (derived from correlation matrices). Indicators that are strongly interrelated are assigned equal weights. Indicators that are to be combined with these "compact sets of indicators" for various monitoring purposes are assigned weights proportional to their "distance" from these compact sets. The method is described with numerical examples, and two taxonomic graphs based on the assessment of development status are presented. The author argues that the issue of assigning weights to components in a composite index is closely related to the matter of variable selection, that is, that the weighting problem can be expressed in terms of reducing an initial list of variables. This perspective is used to support the application of the taxonomic approach. (R/G)

Jaeger, R.M. *An abundance of answers in search of questions: On a methodology of assessment through indicators*. Paper presented at the Annual Reading of the American Educational Research Association, New York, 1977. (ERIC Document Reproduction Service No. ED 135 872)

Some observations are presented on a social indicators approach to statewide educational assessment. The context of the observations is the Oregon Department of Education model for educational planning. Much of what is said can also be applied to educational planning and program evaluation at the federal level or in large school systems. For the purposes of this discussion, a social indicator is defined as any statistical time series on a quantitative variable that is measurable and time-referenced. One-shot measures are excluded, as are sequences of qualitative descriptions. Operating from the premise that agencies may be forced to build educational indicators from extant data collections, some of the methodological problems inherent in this approach are discussed. Some possible solutions are proposed, both short-term and long-term, for measurement issues such as specifications bias, construct validity, and political validity. Possible areas for research and experimentation leading to more ideal sets of educational indicators are described. (ERIC)

Little, D. Social indicators, policy analysis, and simulation. *Futures, the Journal of Forecasting and Planning*, 1972, *4*(3), 220-231.

This article suggests that simulation models would serve as useful tools for developing and using social indicators in the policy-making process. One such model (STAPOL) is described, and current and future applications for this type of simulation are discussed. (ERIC)

Ostrom, C.W., Jr. *Time-series analysis: Regression techniques*. Beverly Hills, California: Sage Publications, 1978.

This slim monograph (83 pages) provides a very readable introduction to the use of regression analysis with time-series data. Many example analyses and illustrations describing the properties of time-series data are presented to illuminate the discussion. An example involving data that describe the status of United States defense expenditures in light of current amounts spent by the U.S.S.R. and amounts spent by the United States in past years is developed in the texts and used to explain several key concepts. Major topics that are discussed include regression analysis with nonlagged and lagged variables, forecasting, and the identification of alternative time-dependent processes. This text provides an excellent introduction to articles describing specific social indicator model-building techniques, such as Anderson (1973). (R/G)

Wachs, M., & Kumagai, T.G. Physical accessibility as a social indicator. Los Angeles: University of California School of Architecture and Urban Planning, 1972. (NTIS No. PB-212-740)

A discussion is presented of the ways in which accessibility to employment and urban services constitutes an important measure of the quality of urban living and how accessibility might, therefore, be included as an important component of a social report for a city or region. A conceptual framework is presented for measuring accessibility in terms of the ease with which citizens may reach a variety of opportunities for employment and services. This framework, which could be used to evaluate transportation and regional plans, differs from current approaches based upon travel volumes and travel times. The use of the proposed measures of accessibility is illustrated with data on accessibility to employment and health care facilities in Los Angeles, and these data are interpreted to illustrate differences as a function of location and socioeconomic status. (G)

Webb, E., Campbell, D.T., Schwartz, R.D., & Sechrest, L. Unobtrusive measures: Nonreactive research in the social sciences. Chicago: Rand McNally, 1966.

The authors review methods of obtaining social science research data by means other than interviews or questionnaires with the dual purpose of broadening social scientists' range of utilized methodologies and encouraging creative and opportunistic exploitation of unusual measurement possibilities. Their principal objection to the use of interviews and questionnaires is that they tend to be used alone and hence introduce systematic bias. These techniques should, therefore, be supplemented by methods that assess the same social science variables but introduce a different sort of methodological bias. In short, multiple operationalism is called for and measurement strategies are introduced that (1) can cross-validate traditionally used procedures and (2) do not require the cooperation of a respondent and, therefore, do not themselves contaminate the response. General categories within which these measurement strategies are presented include (1) physical traces (i.e., erosion and accretion); (2) archival data (both "running records" and episodic and private records); (3) simple observation; and (4) continued observation. Many examples of measures are presented. (G)

SOCIAL INDICATORS: EDUCATION

Educational Testing Service. *Educational indicators: Monitoring the state of education*. Princeton, New Jersey: Author, 1975.

This volume is a collection of six papers that were presented at an invitational conference on educational indicators. The papers include (1) E.B. Sheldon, "The Social Indicators Movement," (2) D.D. Gooler, "The Development and Use of Educational Indicators," (3) S.B. Withey, "Quality of Life as an Educational Outcome," (4) M. Olson, "Measurement and Efficiency in Education," (5) W.J. Cohen, "Educational Indicators and Social Policy," and (6) S.J. Mushkin and B.B. Billings, "Measures of Educational Outcomes in Developing Countries." (G)

Elliott, E. *Social indicators and program evaluation*. Paper presented at the Adult Education Research Conference, St. Louis, Missouri, 1975. ERIC Reproduction Service No. Ed 110 852)

The paper examines social indicators as a way of evaluating macro-level adult education programs. In general, social indicators deal with social factors that affect the quality of life of the population. Social scientists are recognizing the need for both economic and social indicators. Even as the need for social indicators is discussed, the problems that may be associated with their use (questions of measurement, the reduction of social indicators into economic terms, the definition of quality of life) are recognized. Typical social indicators include health, public safety, education, employment, income, housing, leisure and recreation, and population. In assessing adult education programs with respect to social indicators, the time factor seems to be crucial. In a model evaluation, the procedure moves from focusing on a social concern (one source of program objectives) to identifying appropriate social indicators, to collecting evidence, to referring back to the social concern, and the cycle starts again, presumably at a more advanced point in relation to the social concern. All adult educators need to work to establish evaluative procedures that attend to qualitative as well as quantitative aspects of program output. (ERIC)

Felson, M.E., & Land, K.C. *Social, demographic, and economic interrelationships with educational trends in the United States: 1947-74* (Working Paper in Applied Social Statistics No. WP7610). Urbana, Illinois: University of Illinois at Urbana-Champaign, Department of Sociology and Social Science Quantitative Laboratory, 1977.

This paper presents a 34-equation model linking trends in educational enrollments, attainments, and organizations to one another and to certain social, demographic, and economic trends for the United States during the years 1947-1974. The model-building strategy employed integrates many of the ideas of Stone's demographic accounting approach. (G)

Ferriss, A.L. Trends in Education and training. In C. Taeuber (Ed.), America in the 70s: Some social indicators. *Annals of the American Academy of Political and Social Science*, 1978, *435* (January), 157-178.

This article is a commentary on chapter 7 "Education and Training" in *Social Indicators, 1976*. It seeks to interpret the trends revealed by the statistics and addresses the general public and public educational decision makers.

Ferriss, A.L. Monitoring and interpreting turning points in educational indicators. Social Indicators Research, 1974, 1, 73-84.

The author claims that most turning points in educational indicators are not cyclical but respond to major societal events. Three examples are presented. (1) The probability of a 10th grader continuing to the 11th grade has increased linearly for 60 years, being affected positively by unemployment and negatively by increase in GNP per capita and by military expansion. (2) Baccalaureate degrees per high school graduate four years earlier declined with the expansion of secondary education following the 1890s, rose after World War I, and fell as the Depression approached. A major turning point occurred after World War II, and the indicator peaked in 1950. (3) A current downward turning point in the school enrollment rate of 18- to 19-year-old males may have been prompted by a change in Selective Service policies granting exemptions to college enrollees. The author argues that interpreting turning points by identifying the forces that underlie and direct them would increase our knowledge of the cause-and-effect sequences that affect the educational system. He suggests that continuously monitoring educational indicators would facilitate the development of policy and programs to adjust to dysfunctional educational trends. (G)

Ferriss, A.L. Indicators of trends in American education. New York: Russell Sage Foundation, 1969.

Statistical time series on various aspects of education are presented along with discussion of the interpretation of the trends, criteria for the selection of an indicator, and different types of statistical series. Topics include enrollment, teachers, quality of education, graduates, trends in educational organization and finance, and educational attainment. (G)

Flanagan, J.C., & Russ-Eft, D.F. An empirical study to aid in formulating educational goals. Palo Alto, California: American Institutes for Research, 1975.

This study focuses on the effects of educational experience on an individual's quality of life in relation to the importance placed on particular dimensions of quality of life. The study used the "critical incident technique" with a national sample of persons to derive 5 dimensions of quality of life. To assess current status on quality of life, a nationally representative sample of men and women were chosen from the Project TALENT survey (ensuring the availability of background data). Participants were interviewed to gather information on their experiences, decisions, and perceptions related to the various dimensions of quality of life, and their current satisfaction vis-a-vis each dimension was determined. The study pinpoints the following areas of educational practice that should be developed further: (1) vocational guidance, (2) quality of teaching, (3) individualized instruction, (4) curriculum, and (5) personal support and guidance. (G)

Gitter, A.G., & Fishman, J.E. Social indicators of educational opportunity (CRC Report No. 68). Boston: Boston University Communication Research Center, 1973.

The authors developed two types of factor analytical social indicators--factor scores and basic variables--which were shown to apply in aggregating multivariate education data. State indicators of educational input and educational output for 1960 were computed. They were used as dependent measures in analyses of variance and covariance, with region, density, urbanization, percent of whites, personal income, and nonwhite migration as independent variables. The relationships between social indicators of educational input and output were tested, both with and without controlling for the context of the relationships. Procedures for computing both state and national indicators for a base year and any subsequent years are described. (PSYCH ABS)

Greenbaum, W. *Measuring educational progress: A study of the national assessment*. New York: McGraw-Hill, 1977.

This book provides a comprehensive evaluation of the goals, objectives, and procedures of the National Assessment of Educational Progress (NAEP). Separate chapters discuss NAEP's objectives and organizational development; its division of knowledge into subject areas; the subject-area objectives; exercise development; measurement of background variables; the sampling design and the exercise packages; reporting of results; past and future uses of the assessment; and social indicators and the reform of education. Highly critical of some aspects of NAEP, the study is followed by a response from the staff of the National Assessment. (ERIC)

Johnstone, J.N. *Indicators of the performance of educational systems* (IIEP Occasional Paper No. 41). Paris: International Institute for Educational Planning, 1973.

In this paper, discussion is restricted to indicators of educational system performance. By "educational system" is meant that system that is formally established within a country for the purpose of providing education according to the UNESCO definition of the term. What is said generally applies to indicators in other fields of the social sciences as well as to social and development indicators in general. The paper begins by establishing a theoretical model within which educational indicators can be defined and by discussing certain conceptual problems concerning the purposes for which indicators might be used and the methodological problems encountered in forming indicators. After a review of educational indicators developed to date, the paper develops a core of ten educational indicators and demonstrates two approaches to using them to map educational systems performance across and within nations. The paper concludes by outlining research that may be conducted to extend both the core of indicators and the methodology proposed. (ERIC)

Koshal, R.K., Gallaway, L.E., & Akkihal, R.G. Determinants of male and female higher education in the United States. *Social Indicators Research, 1976, 3*(1), 111-121.

In this paper, an attempt is made to estimate separately the male and female demand functions for higher education in the United States and to determine which variables affect the degree of demand differentially for the two sexes. Data for 45 of the states were accessed from the *Digest of Educational Statistics, 1971*, the *Comparative Guide to American Colleges, 1972*, and the *Statistical Abstract of the United States*. Ordinary least squares regression was used to estimate separate demand functions for male and female enrollment. In order to determine the relative importance of variables on male and female enrollment, partial enrollment elasticities with respect to these variables at their mean values were calculated. The results suggest that there is no significant difference between the responsiveness of male and female enrollment in terms of the explanatory variables except for the rate of return of higher education. Male enrollment is responsive to such market changes, while female enrollment appears to be independent of this variable. The elasticities with respect to tuition and family income suggest that parents in general do not discriminate between male and female children in terms of sending them to institutions of higher education. (G)

Mushkin, S.J., & Stageberg, S. *National assessment and social indicators, January 1973.* Washington, D.C.: Georgetown University Public Services Lab, 1973. (ERIC Document Reproduction Service No. ED 082 290)

National Assessment of Educational Progress is a survey of how much United States citizens know about and what they are capable of doing in ten broad subject areas. This pamphlet outlines the types of findings on educational achievement that might be made from the statistical data on knowledge, attitudes, and skills being gathered. Additionally, the report examines social indicators that could be developed from the data, explores the use of National Assessment data for the understanding of educational achievement, and considers how National Assessment might contribute to a measurement of the quality of life. (ERIC)

National Center for Education Statistics. *The condition of education.* Washington, D.C.: U.S. Printing Office, 1975-1980.

The Condition of Education, a statistical report describing conditions in education as well as conditions in the larger society that affect education, is the most prominent social indicators report in the field of education. The Condition of Education has been published annually in June since 1975 by the Division of Statistical Services in the National Center for Education Statistics under the editorial direction of Mary Golladay. The 1978 edition, e.g., contained 117 charts with accompanying tables in six content areas: the context for examining the condition of education; elementary and secondary education; postsecondary education; educational personnel; financing higher education; and youth education and labor force participation.

Olkinuora, E. On the problems of developing education indicators. *Acta Sociologica*, 1973, *16*, 284-302.

This article examines the problems that can arise in the development of educational indicator systems. The work is based on a review of the social indicators literature and on the author's personal involvement in a project to develop educational indicators at the Institute for Educational Research, University of Jyvaskyla, Finland. The problems that are discussed concern (1) development of a frame of reference for indicator selection, (2) operationalization of variables, (3) construction of indicators, and (4) political considerations involved in the selection and use of particular indicators. A preliminary frame of reference is presented that integrates quantitative and qualitative educational inputs and outputs with (1) educational equality, (2) educational relevance from the societal perspective, (3) educational relevance from the individual's perspective, and (4) educational efficiency. Problems of operationalizing goals within this framework are illustrated, and the inadequacies of existing education-related data for addressing the suggested goals are enumerated. The implications of educational indicators for policymaking are discussed from both the "optimistic" view that indicators can provide educational information more concisely and the "pressimistic" view that indicators will not influence policymaking any more than other education-related data because policymakers rely largely on political considerations in formulating educational policy. (G)

Organization for Economic Cooperation and Development. Indicators of performance of educational systems. Washington, D.C.: OECD Publications Center, 1973.

This report is an outline of a system of indicators for evaluating the performance of educational systems and grew out of OECD work on social indicators. Existing statistical data on education consists of "inputs." The desire expressed in this study, however, is to measure "outputs," or actual system performance. Whenever a relationship exists between a statistical measure of education and a notion of welfare or well-being, it is called, for the purposes of this report, an indicator (i.e., it measures output or performance). After a short introductory chapter, the second chapter discusses approaches and methods toward the selection of goals and the evaluation and construction of indicators. Possible goal areas in education discussed in Chapters 3-7 are transmission of knowledge and skill, education and the economy, equality of educational opportunity, provisional educational services for individual requirements, and education and the quality of life. These chapters make precise statements about the different emphases that are possible inside a general area and, within those subareas, discuss possible indicators and the assumptions required for their construction. When a specific indicator emerges from the consideration of goals, the policy implications of its variation are discussed. (ERIC)

Organization for Economic Cooperation and Development. A framework for educational indicators to guide government decisions. Paris: Author, 1973.

Mainly dealing with proposals concerning indicators for measuring the impact of education on society, this report attempts to present a framework of educational statistics related to the main policy concerns of member countries. Indicators are assessments of the condition of society vis-a-vis its aspirations and goals. The report defines some of the more important general policy objectives and examines statistical measures that are most useful to monitor progress or regression within each area of concern. This approach admits that indicators of performance must be multidimensional so that education can meet its many objectives, including contributions to the transmission of knowledge, equality of opportunity and social mobility, meeting the needs of the economy, individual development, and transmission and evolution of values. Finally, the effective use of resources in pursuit of the policy objectives is discussed. (ERIC) NOTE: See also Jaeger, R.M. in: SOCIAL INDICATORS: METHODS

FUTURES STUDIES: SOURCES

California State Department of Education. A brief annotated bibliography on (1) societal futures; (2) educational futures; (3) educational alternatives and change; (4) resources: societal and educational. Sacramento: Author, 1979.

Publications selected to provide educators with information about changing societal values, attitudes, technologies, jobs, lifestyles, and political structures, and about the implications of these changes vis-a-vis education and educational processes, are listed in this annotated bibliography. Part I lists and annotates 41 books representing a cross-section of views of societal futurists. Seventeen references on the field of educational futures are presented in Part II. Part III comments on 15 books on educational change that might offer implementation assistance at the school or district level. Part IV lists 13 organizations which can provide information about societal and educational futures. References which are of special interest to those beginning a study of the future are noted in each section. Also presented are lists of additional writers whose works may be of interest. (ERIC)

Cornish, E. The study of the future: An introduction to the art and science of understanding and shaping tomorrow's world. Washington, D.C.: World Future Society, 1977.

A general introduction to futurism and future studies. Chapters discuss the history of the futurist movement, ways to introduce future-oriented thinking into organizations, the philosophical assumptions underlying studies of the future, methods of forecasting, current thinking about what may happen as a result of the current revolutionary changes in human society, etc. The volume also includes detailed descriptions of the life and thinking of certain prominent futurists and an annotated guide to further reading. (WFS)

Fowles, J. (Ed.). Handbook of futures research. Westport, Ct.: Greenwood Press, 1978.

This handbook is an attempt to explain the aims and content of the relatively young field of futures research to a somewhat uninformed but interested audience. It contains 41 articles, authored or co-authored by leading futurists. The articles which are described as "representative of the matters discussed in the journals futurists read and the conferences they attend" reveal a considerable diversity in the approaches to futures research. They reflect the current troublespots in the field as well as its vitality.

The book is divided into 5 parts. Part I contains three articles about the growth of futures research while Part II gives an overview of the major difficulties of the field. Part III discusses the various procedures, the "how", of futures research. Specifically, it contains articles on the practice of intuition, the utility of science fiction, images of the future, scenarios, trend extrapolation, the Delphi technique, cross-impact analysis, simulation modeling, simulation gaming, technological forecasting, technology assessment, and social indicators and social forecasting. Part IV describes substantive areas for futures research, the "what", for instance, in the fields of population, food supply, energy, environment, urban development, communications, biomedical research, technology, politics, education, and space. Part V discusses future challenges for futures research.

Appendices on existing journals, periodic reports, graduate programs, and organizations in futures research supplement the overview. In addition, a brief glossary and notes on the contributors are provided.

Johansen, R., & Samuel, P.A. Future societal developments and postsecondary education: A handbook for citizen organizations (Report R-38). Menlo Park: Institute for the Future, 1977. (ERIC Document Reproduction Service No. ED 144 421)

This handbook is addressed to organizations with goals related to post high school learning. Basic information is provided about future societal developments in the United States that should be taken into consideration in making organizational decisions. Some practical methods for long-range planning are also outlined. Four areas of societal change are considered: (1) demographics; (2) work; (3) political economy; and (4) "learning inventions." In exploring the four areas of change, the likely trends in each are plotted and some possible sources of discontinuity are examined. The authors' judgments about these societal developments and their implications for postsecondary education are included as notes to the text. (ERIC)

Marien, M. Societal directions and alternatives: A critical guide to the literature. LaFayette, N.Y.: Information for Policy Design, 1976.

A guide to the literature dealing with what various thinkers believe is happening in our society. This extensively annotated bibliography provides listings of books on a wide variety of topics, including: Optimists and Pessimists, Ecology and the Limits to Growth, World Order, Decentralization, Human Needs, Government Reform, Redistribution of Wealth and Power, etc. This is a fascinating volume to dip into. (WFS)

Marien, M. (Ed.). The hot list Delphi: An exploratory survey of essential reading for the future. Syracuse, N.Y.: Syracuse University, Educational Policy Research Center, 1972. (ERIC Document Reproduction Service No. ED 071 192)

This report lists 236 books and articles of which 192 have been rated by a panel of 14 qualified futurists. The findings of this survey are being made available to aid in the professionalization of the field of futures research; to encourage more and better surveys such as this one; and to provide a somewhat authoritative list of selected readings for policymakers, professionals, students, and concerned citizens who wish to further their understanding of futures, futurists, and futuristics. The documents are rated according to merit and reading audience. Futures documents are annotated and classified according to (1) general overviews; (2) general symposia and anthologies; (3) technology and its impacts; (4) population, resources and environment; (5) government and international relations; (6) business and economics; (7) the individual, the family, and youth; (8) communications and education; (9) futures "classics"; (10) utopias and science fiction; (11) methodology; and (12) bibliographies and directories. From these documents, 36 were selected as a recommended basic library for futurists. The review also includes information about how to acquire the documents surveyed. (ERIC)

Staman, E. A catalogue of planning in higher education: Organizations, periodicals, bibliography. Washington, D.C.: Society for College and University Planning, 1978.

This document is designed to be a catalogue of source information related to higher education planning and administration, with an emphasis on the tools required for planning personnel.

World Future Society. The future: A guide to information sources (2nd ed.).
 Washington, D.C.: World Future Society, 1979.

This second edition of "The Future: A Guide to Information Sources" represents an extensive revision and includes considerably more information than the first edition published in 1977. This volume contains lists of individuals, organization, research projects, books and reports, periodicals, films, tapes, games and simulations, media presentations, and courses and programs offered by educational institutions. In addition, it offers a glossary of terms frequently found in writing about the future and several indices. It's an invaluable source of information for everyone involved in the study of the future(s).

FUTURES STUDIES: GENERAL

Bell, D. *The coming of post-industrial society: A venture in social forecasting*. New York: Basic Books, 1973.

This book contains most of the concepts that sociologist Bell has developed in recent years. Scholarly and well-documented, it offers a thoughtful analysis of the great social trends that are shaping our future society. Bell argues that people can make meaningful forecasts about the future of modern society if they take the trouble to understand fully the present conditions of that society and the trends visibly at work in it. (WFS)

Boucher, W.I. (Ed.). *The study of the future: An agenda for research.* Washington, D.C.: National Science Foundation, 1978. (ERIC Document Reproduction Service No. ED 148 318)

This collection of 18 papers is concerned with the beliefs, methods, practices, and results associated with the type of forecasting which has become known in the last 10 to 15 years as "futures research". Topics discussed include: (1) forecasting methodology; (2) the validity of forecasting systems; (3) unforeseen developments; (4) forecasting in political science, sociology, technology, and economics; (5) normative forecasting; (6) forecasting for decisionmaking and policymaking; (7) professional issues in forecasting research; and (8) the future of futures research. Results of a survey of current forecasting efforts and a bibliography are appended. (ERIC)

Clarke, A.C. *Profiles of the future: An inquiry into the limits of the possible* (Rev. ed.). New York: Harper and Row, 1973.

This is a new edition of one of the classics of futurist literature. The book was originally published in 1963 and some of the things that Clarke spoke of have already come true. The first two chapters explore the question of why prophets in the past often failed to foresee the future. Clarke attributes this to (1) a failure of nerve and (2) a failure of imagination. In the one case, the would-be prophet has all the facts but cannot see that they point to an inescapable conclusion. In the other case, the prophet does not have the facts and can't imagine them. Later chapters explore such topics as transport, ground-effect machines, ocean mining, space, etc. This exceptionally well-written and scientifically balanced book presents the author's imaginative forecasts for the next 150 years. Clarke maintains that it is impossible to predict the actual future in any detail but one can delineate the general direction that development might take and indicate the realistic possibilities. (WFS)

Cole, S., Gershuny, J., & Miles, I. Scenarios of world development. *Futures*, 1978, *10* (February), 3-20.

This article looks at 16 recent studies of global futures and examines their conclusions within a sociopolitical framework. Three idealised world-views--conservative, reformist, radical--are constructed from this framework; they are then married with a classification based upon the two parameters of high growth-low growth and equality-inequality. This allows for the concise mapping of existing scenarios and, by the elucidation of the major differences in sociopolitical forecasts, provides a simple but effective technique for comparative analysis. Two quality-of-life issues, the future of work, and of political development and change, are used as concrete examples of how the method can be used to create a series of scenarios which cover the whole socio-political spectrum of alternative futures. (AUTHOR)

Cornish, E. 1999: The world of tomorrow. Washington, D.C.: The World Future Society, 1978.

This anthology of articles from THE FUTURIST is divided into four sections: "The Future as History," "The Future as Progress," "The Future as Challenge," and "The Future as Invention." The subjects covered included economic visions, architecture, medicine, space colonies, energy, education, sex, work, appropriate technology, the automated office, and social inventions. (WFS)

Drucker, P.F. The age of discontinuity: Guidelines to our changing society. New York: Harper and Row, 1969.

Economist Drucker describes four areas of significant discontinuity: (1) new technologies--not embroiderments on old ones, but entirely new ones--which will bring about new industries and render some existing ones obsolete; (2) the world economy, which is becoming a single market, one "global shopping center"; (3) highly organized power concentrations to which all our social tasks have been entrusted, but concerning which there is increasing disillusionment; and (4) the centrality of knowledge, which Drucker views as the most important of the four discontinuities. "Knowledge during the last decades," Drucker says, "has become the central capital, the cost center, the crucial resource of the economy. This changes labor forces and work, teaching and learning, the meaning of knowledge and its politics." Drucker anticipates an upcoming period of change in the world economy with four new industries becoming major forces: those based on information, oceans, materials, and the megalopolis. Drucker forecasts that the knowledge industry will account for one-half of the total national product in the late 1970s. (WFS)

Ferkiss, V.C. Futurology: Promises, performances, prospects. Beverly Hills, California: Sage Publications, 1977.

One of the "Washington papers written for the Center for Strategic and International Studies, Georgetown University, this book presents a survey of the art and science of predicting the future. (WFS)

Harman, W.W. The coming transformation. Futurist, 1977, 11(1), 4-11.

The industrial nations face mounting crises due, ironically, to their success in solving earlier problems. The solution to the current crises may lie in a basic transformation of the societies themselves. Social forces which might bring about such a transformation arise both from the nature of the fundamental dilemmas now faced by the industrialized world, and a resurging sense of transcendental values and goals. Research on alternative futures carried out during the years 1967 to 1977 at Stanford Research Institute is summarized. Most scenarios for the future tend to lie in 1 of 2 groups. One group sees a future of gradual change, evolving along the lines of the modernization trend of many past centuries. The 2nd group sees the likelihood of an inflection in this trend: industrial society, faced with a set of dilemmas rooted intrinsically in the industrial paradigm, will transform itself into a significantly different "transindustrial" society, probably with a wrenching and traumatic transition period. (SOCIOL AB)

Hirschhorn, L. Post-industrial life: A US perspective. Futures, 1979, 11 (August), 287-298.

This article discusses the observation that adulthood is no longer the relatively static plateau of personal development. Increasing freedom of choice between life and work, and within work itself, produces greater responsibilities and an increase in psychological stress. The family, the school, and various other social institutions are losing their rigid control over an individual's life course. Developmental adulthood is now emerging, as the categories of youth and adolescence emerged in the 19th century. If changes in the fields of culture, work, and social scheduling are out of step, problems of marriage breakdown, decreased economic growth, or personal aimlessness will result. The author suggest that even if the changes are in harmony, a time-sensitive social policy will be necessary to bridge the growing gap between individual decisions and aggregate flows of people, resources, and jobs. (AUTHOR)

Holroyd, P. Change and discontinuity: Forecasting for the 1980s. Futures, 1978, 10 (February), 31-43.

This outline of forecasting takes a very broad view--covering many of the diverse approaches now available--so that attention can be paid to the role of forecasting in discovering and analysing alternatives, as well as to its established role in prediction. The philosophy of forecasting and the differing methodological approaches are discussed, highlighting particularly the problem of continuity and discontinuity in change, and the concepts of the cultural barrier and the paradigm shift. The author, applying the idea of discontinuity in social change (the paradigm shift), examines some possibilities for the 1980s. He argues that in the field of social forecasting, which is now becoming an important element in all other types of forecasting, the forecaster's capability to foresee broad changes in values is crucial, since such changes will themselves lead to further developments throughout society. Forecasting is now reaching the stage where its methods and philosophy allow us to assess potential hazards, and to preact, rather than react, to them. (AUTHOR)

Jantsch, E. Technological planning and social futures. New York: Wiley and Sons, 1972.

This book consists mainly of articles which the author has published since his survey of methods and organization of technological forecasting in 1967. It reflects his growing concern with the framework of thought and action in which forecasting techniques are employed.

After developing a general framework for long-range thinking, its application to the development of technology and its translation into terms of corporate planning, Jantsch gives a brief survey of some of the principal categories and methodological concepts of technological forecasting. He, then, deals with the basic shift from product-oriented to function-oriented thinking which accompanies the introduction of strategic long-range planning and discusses its organizational implications. In his final chapters, he turns his attention to the roles and responsibilities of corporations and outlines changes which will be introduced to scientific and technological activity in general, and the University, in particular, if science and technology are to be marshalled for a long-range purpose of mankind.

de Jouvenel, B. (The art of conjecture) (N. Lary, Trans.). New York: Basic Books, 1967.

Originally published in France in 1964, this book has become one of the classics of futurist literature. De Jouvenel, widely known as an economist and philosopher, regards looking into the future as an art rather than a science. After laying the philosophical groundwork for the new emerging field, he urges the creation of a "forecasting forum" to develop the art for government, industry, and people at large. (WFS)

Kahn, H., Brown, W., & Martel, L. The next 200 years: A scenario for America and the world. New York: William Morrow and Co., 1976.

Kahn and his Hudson Institute colleagues present a highly optimistic view of America's future. They express confidence that Americans will become increasingly wealthy and that the problems associated with shrinking supplies of fossil fuels and increasing pollution can be overcome. This book might well be read in conjunction with the more pessimistic Awakening from the Dream by Rufus E. Miles, Jr. (WFS)

Linstone, H.A., & Simmonds, W.H.C. (Eds.). Futures research: New directions. Reading, Mass.: Addison-Wesley, 1977.

The theme which underlies the 25 articles of this book is the contention that futures research, as well as research in general, "must move beyond the objective, analytic, reductionist, number-oriented, optimizing, and fail-safe ways." It must "learn to think with equal fluency in more subjective, synthesizing, holistic, qualitative, option-increasing, and safe-fail ways." The heart of the matter is the perceptual change in the research worker him/herself. Foremost, futures research is the formulation of the questions.

The three major parts of the book deal with the shifting foundations in research in general and futures studies in particular, issues and difficulties in managing complexity, and critical questions in regard to currently used methodologies. In addition, a number of recent projects in futures research are described.

One of these projects, "The Problem of Critical Problem Selection" by Teige, P. et al., provides the reader with a list and brief description of 41 future national and international problems. This list is seen by the editors of this book as a crude guage to "determine the gulf between the state of the art and the desiderata in futures research."

Biographical data of the editors and contributors supplement the book.

Loye, D. The knowable future: A psychology of forecasting and prophecy. New York: John Wiley and Sons, 1978.

One of the main purposes of this book is to examine the science lying behind futures prediction as a form of venture as well as an informal mass activity. The author presents a case for viewing the task of futures forecasting as a central problem to all science that could be used to revitalize social science and provide for a shift in paradigm.

In Part I, Loye provides the reader with a common body of basic information about forecasting and a futures-relevant psychology. In Part 2, he moves on to applications, the "how to" aspects of forecasting. He describes the research and development of his Ideological Matrix Prediction (IMP) and pays special attention to the use of right as well as left brain operations in futures prediction.

Michael, N. On learning to plan--and planning to learn. San Francisco: Jossey-Bass, 1973.

Though most people agree there is need for long-range social planning, almost no such planning is underway. The author, a social psychologist, explans the various resistances in individuals and groups that must be overcome in order to have long-range social planning. (C)

Miles, E., Jr. Awakening from the American dream -- The social and political limits to growth. New York: Universe Books, 1976.

Formerly a top career official of the U.S. Department of Health, Education, and Welfare and later President of the Population Reference Bureau, Rufus Miles currently is senior fellow and lecturer at the Woodrow Wilson School of Public and International Affairs at Princeton University. In this book he analyzes 22 determinants that have brought American society to its present state. He believes that American society is highly vulnerable to further social deterioration, sabotage, and breakdown. This highly pessimistic work may be contrasted with Herman Kahn's highly optimistic volume, The Next 200 Years. (C)

Perloff, H. (Ed.). The future of the U.S. Government: Toward the year 2000. New York: George Braziller, 1971.

This is a report of a task force of the Commission on the Year 2000 of the American Academy of Arts and Sciences. The book includes 19 essays plus panel discussions. The book's editor is Dean of the School of Architecture and Urban Planning at the University of California at Los Angeles.
Perloff says that the activities of the task force centered on two themes: (1) the most significant problems and critical issues that the government of the United States will have to face, and (2) the institutional changes and processes needed to enable the government to cope effectively with these changes. (C)

Schwarz, S. (Ed.). Knowledge and concepts in futures studies. Boulder: Westview Press, 1976.

This book contains 12 essays, written by Swedish scientists, which discuss the question of the role of futures studies in decision-making and long-range planning. The authors address methodological problems in future studies as well as conceptual and analytical issues.

Spekke, A.A. (Ed.). The next 25 years: Crisis and opportunity. Washington, D.C.: The World Future Society, 1975.

This volume is a selection of 47 thought-provoking papers submitted to the World Future Society's Second General Assembly, June 1975. The meeting was the largest gathering of futurists ever held (approximately 2,800 attendees). The papers were selected for their general interest and relevance to the theme of the meeting--a look at the prospects for mankind during the final quarter of the 20th century. (WFS)

Theobald, R. An alternative future for America's third century. Chicago: Swallow Press, 1976.

Ranging over many themes, socio-economist Theobald attempts to explore the problems mankind faces, the possibilities for deep change presented by these problems, and how people can hope to bring about the revolution in values, institutions, and systems needed to avoid extinction. He covers such themes as communications, the environment, education, the theory of guaranteed income, and income distribution. (C)

Weaver, R.A. Whither goest futur-(es), -(ism), -(ology), -(istics) in education? Educational Research Quarterly, 1977, 1(4), 5-12.

Futures research is defined as the development and use of forecasting techniques: (1) for estimating the likelihood of an event's occurence over time; (2) for examining the probability of one event's occurence affecting the likelihood of another even'ts occurence; and, (3) for analyzing the relationships among forecasted alternatives. (ERIC)

FUTURES STUDIES: METHODS

Allen, T.H. Cross-impact analysis: A technique for managing interdisciplinary research. Journal of the Society of Research Administrators, 1978, 10(1), 11-18.

Cross-impact analysis can be used to deal with the conceptual and communication obstacles found in complex research efforts such as attempting to organize large amounts of data connected with larger research efforts and attempting to plot the numerous cause and effect stimuli. Cross-impact analysis is a method that can be used to reveal and examine interactions among future events. It reveals the conditional probabilities of forecasted events in a set and identifies the potential interactions among the events in the set. Cross-impact analysis presents events and their associated probabilities in a matrix form which makes judgments more explicit. Cross-impacts or interactions between events often suggest new causal and correlational linkages never noticed before. The method can also be used to test policies. References. (INFO)

Alter, S. The evaluation of generic cross-impact models. Futures, 1979, 11 (April), 132-150.

The first cross-impact models were developed ten years ago. Since then, many versions of this technique have been developed. This article proposes criteria for evaluating generic cross-impact models and demonstrates the use of these criteria. It distinguishes carefully between generic cross-impact models and application models. Generic models consist of mathematical definitions and computational procedures; application models consist of a generic model plus appropriately expressed data relevant to the topic being analysed. Four criteria are proposed for evaluating generic cross-impact models: internal consistency, robustness, generality, and clarity. (AUTHOR)

Amara, R.C. A note on cross-impact analysis: A calculus for sequence-dependent events. Futures, 1972, 4 (September), 267-271.

Commonly, cross-impact analyses employ methods which use the notions and assumptions of conditional probabilities. Accordingly, effects dependent on time sequence of events are usually not considered. Since the time sequence or order of events or developments is often overriding in determining absolute, conditional, and joint probabilities, a need exists to define and develop a suitable calculus for describing such interactions. Such is the purpose of this article.

Armstrong, J.S. Long-range forecasting: From crystal ball to computer. New York: J. Wiley & Sons, 1978.

This is a book about long-range forecasting methods written for people who have done or are doing forecasting in business, government, academic, or consulting. It is written in a clear and jargon-free language, well structured, and filled with practical examples from all areas of the social, behavioral and management sciences.

The book is divided into five parts. Part I, "Getting Started", describes how to implement different methods of long-range forecasting, discusses the systems approach and its relevance to long-range forecasting, and outlines some general research strategies. Part II, "Forecasting Methods", examines methods one might use in long-range forecasting. Consideration is given to the most effective way to use judgmental, extrapolation, econometric, and segmentation methods, as well as to combinations of these methods. The use of amalgamated forecasts is also examined. Part III, "Evaluating Models", discusses how to evaluate forecasting models. This includes how to analyze inputs to a model, as well as how to analyze the outputs from it. Part IV, "Comparing Methods", examines the relative advantages of each of the forecasting methods. Evidence is presented to identify which methods are best in which situation. A guide is constructed for the selection of the methods most appropriate for a specific problem. Part V, "Commencement", discusses what forecasting methods will prove to be more popular and more useful in the future. It also suggests areas where further research on forecasting methods will be most valuable.

Armstrong's book can also be used as a guide and reference to forecasting methods. An extensive bibliography with explanations and ratings, a list of references with "promising titles that should be of interest to readers of long-range forecasting", a glossary, and a number of appendices are provided for this purpose.

Eden, C. Modelling the influence of decision makers on the future. Futures, 1977, 9(4), 272-284.

Attempts to use futures research in a specific framework are described: the development of a model to be used as a basis for action within a UK local authority. The model is designed to explore the ramifications of the decision-making activities of real people within a specific organization. It represents an original attempt to include explicitly the acts of human endeavor which influence the direction of the future within a model for indicating possible futures. The current state of the model-building activity which is intended to depict the policy-making process is described. The model is based upon concepts drawn from cognitive psychology & sociology. The model meets its primary objective in organizational design and can be utilized as a tool for policy making. 5 Figures. (SOCIOL AB)

Enzer, S. INTERAX - An interactive model for studying future business environments (Monograph 35). Los Angeles: USC, Center for Futures Research, 1979.

The extended planning horizon together with the rapid pace of change have made the topic of developing environmental (contextual)scenarios for strategic purposes extremely difficult and time-consuming. For this reason, the Center for Futures Research developed a forecasting procedure, INTERAX, which contains data needed to analyze a wide range of strategic issues in a computer model that is ready for immediate use in analyzing issues as they arise. This paper briefly describes the rationale, data, and alternative ways in which INTERAX can be used.

Enzer, S. Interactive cross-impact modeling (Monograph 27). Los Angeles: USC, Center for Futures Research, 1976.

This report covers the status of the methodological research through the second year of the 20 Year Forecast Project of the Center for Futures Research. The method described in this paper is based on the assumption that the future cannot be "predicted" or "pre-told", since it contains many uncertainties and is affected by societal actions which basically defy scientific analysis. The author, therefore, suggests that an approach to developing greater insight into alternative future scenarios has to be in the domain of a structured art form, not a scientific process. The interactive cross-impact modeling approach is discussed with its emphasis on policy analysis and accounting.

Enzer, S.,& Alter, S. Cross-impact analysis and classical probability: The question of consistency. Futures, 1978, 10 (June), 227-239.

A great deal of confusion has surrounded the basic definitions and concepts in the various versions of cross-impact analysis. The purpose of this article is to clarify the meaning of one of the fundamental concepts--conditional probability--as used in a cross-impact analysis. The authors begin by illustrating two versions of conditional probability, one based on correlation and one based on causation, and show that the latter is much better suited to the study of alternative futures. One of the main sources of past misunderstanding is the attempt to apply the correlative conditions of Bayes' theorem to a causative cross-impact analysis. They demonstrate that there is no inconsistency between Bayes' theorem and cross-impact analysis; the confusion results from the use of Bayes' theorem when the basic analysis involves causation. (AUTHOR)

Ewing, R.P. The uses of futurist techniques in issues management. Public Relations Quarterly, 1979, 24(4), 15-18.

Issues management arose from the recognition by corporations that they take account of and participate in, when appropriate, the public policy process. Moreover, public pplicy can be defined as the main mechanism for the social control of business. Futures research is also referred to as social forecasting. Futures research is an older concept than issues management and its tools and methods are now being incorporated into issues management procedures. Today, futurists come from all disciplines, occupations and avocational fields. Although over 150 forecasting techniques have been developed, only about 12 are widely used. These include: (1) trend extrapolation, (2) trend impact analysis (TIA), (3) scanning, (4) monitoring, (5) the Delphi technique, (6) cross-impact analysis, (7) computer simulations, (8) scenario writing, and (9) technology assessment. Congress established its office of technology assessment in 1974, and it has been active in developing reports to aid legislators to evaluate the impact of new technology. Among other techniques used in futures research, one new approach being developed is called ideological matrix prediction (IMP). references. (INFO)

Fowles, J. The problem of values in futures research. Futures, 1977, 9(4), 303-314.

Future research results in one contemporary set of values being elevated above others, then imposed upon the future. The imposition comes in the form of plans, which are certain not to harmonize perfectly with future values, as values fluctuate in time. A three-point approach is proposed for reducing the discrepancy between futurist values, expressed in plans, and the values found among the eventual subjects of plans. The three steps include: (1) hazarding guesses about future values, (2) considering altering future values, and (3) creating flexible plans. A combination of the three is necessary for dealing with the discrepancy between present plans and future values. (SOCIOL AB)

Fowles, J. An overview of social forecasting procedures. Journal of American Institute of Planners, 1976, 42(3), 253-263.

Extrapolation from trend measurements is the most common of systematic methods for forecasting the future or large-scale social systems. The search for a firmer conceptual basis of extrapolation has taken two forms - (1) certain psychological elements held in common by the members of a social system presage subsequent sociocultural realities. The factors included are images of the future, values, aspirations, and motives; (2) the second approach is to project forward an understanding of the social system itself. In the field of futures research, this has resulted in such techniques as the Delphi method, scenario writing, simulation modeling, and cross-impact analysis. (INFO)

Godet, M. The crisis in forecasting and the emergence of the "prospective" approach. Oxford: Pergamon, 1979.

This is an introduction to the development of scenarios. Godet spends considerable time explaining the limitations of traditional or, to use his terminology, classical forecasting methods. Godet then proceeds to describe in detail a method of scenario development which he has used in a variety of applications in France. The last two chapters of the book provide specific examples of the use of the method. (C)

Helmer, O. Problems in futures research, Delphi and causal cross-impact analysis. Futures, 1977, 9(1), 17-31.

Futures analysis deals with areas for which no definite natural laws exist. In these conditions, reliance on the opinions of experts becomes necessary. The Delphi technique, as defined by N. Dalkey and O. Helmer ("An Experimental Application of the Delphi Method to the Use of Experts," Management Science, 1963, 9), offers a means by which opinions within an expert group can be exchanged. This approach deals with events one at a time. An extended method, cross-causal impact analysis, in which the impact of an event or condition in one time period on other events or conditions in later time periods is estimated, allows the formation of models of processes. An example of this technique is presented. It offers the possibility of confronting estimators with explicit implications of their estimates which can improve the consistency of these estimates. Once a model so formulated has reached a stage at which it is considered fairly realistic, it can be used for planning purposes. The presented model still has many imperfections, but it offers a possible advance on current technologies. 1 Figure, 8 Tables, Appendix. (SOCIOL AB)

Linstone, H.A., & Turoff, M. (Eds.). The Delphi Method: Techniques and applications. Reading, Mass.: Addison-Wesley, 1975.

This book is a collection of articles which were written during the first half of the seventies on a diversity of applications of the Delphi Method. The editors deliberately selected contributions which relfect the vast differences in the use of the method in order to show that "in its design and use Delphi is more of an art than a science." All but four of the articles were esepcially prepared for this book.

In their introductory chapter, the editors give a brief account of the evolution of the Delphi Method, its characteristics, and the reasons for its use, successes and failures. Chapters II and III consist of articles which provide an overview of the method, its utility, the underlying philosophy, and broad classes of applications. Questions of precision and accuracy of Delphi are considered in chapter IV. Chapters V and VI describe some of the specialized techniques that have evolved for asking questions and evaluating responses, foremost among them the cross-impact analysis. The effect computers can have on Delphi and speculations on the future of the technique itself are discussed in Chapter VII. The book concludes with a summary of pitfalls which can serve the practioner as a continuing checklist (Chapter VIII).

In addition to the references associated with each of the articles in the book, Linstone & Turoff provide the reader with a comprehensive bibliography which is broken down into a number of separate sections for the purpose of greater utility to the user. Biographical data of the editors and contributors are also included.

Lipinski, H., & Tydeman, J. Cross-impact analysis: Extended KSIM. Futures, 1979, 11 (April), 151-154.

The authors present an extension of Kane's(1) cross-impact simulation model (KSIM) that allows the inclusion of events and trends, and discuss the basic issues of forecasting and compatibility of forecasts.

(1) Kane, J. A primer for a new cross-impact language - KSIM. Technological Forecasting and Social Change, 1972, 4, 129-142.

Lowenhar, J.P., & Stanton, J.L. Computer time sharing: 180 time series analysis techniques combined form an effective, understandable forecasting tool. Marketing News, 1975, 8(22), p. 6.

The service-bureau company has combined all of the existing time-series-analysis forecasting techniques into one package on its management time-sharing system. Marketing executives report that with it they can accurately plan sales quotas, control costs, and monitor many segments of the marketing plan they previously could not measure. The 180 unified techniques eliminate the theoretical 'guessing' previously relied on. For the marketer, TSA can help augment decisions with respect to market monitoring, promotional plans, and product-market potential, for long-run and short-run decision-making. TSA is relatively inexpensive, related to the out-of-pocket costs generated and to the cost of the manager's time. Since the manager has % hands on < when using TSA with time-sharing, he does not require the interface between data-processing and his department. Some time-sharing companies provide extensive education and non-technical literature assistance in the forecasting area. (INFO)

Martino, J.P. Technological forecasting for decision-making. New York: Elsevier, 1972.

A comprehensive, authoritative treatise on the methodology of technological forecasting and its application to social, business, and government decision-making. (WFS)

Mitchell, R.B., Tydeman, J., & Curnow, R. Scenario generations: Limitations and developments in cross-impact analysis. Futures, 1977, 9(3), 205-215.

Informed subjective judgment has a place in decision making, and cross-impact analysis may be useful in providing this information. Focus here is on the art of scenario generation, review of several existing procedures, and their limitations. The information needs of decision makers are discussed and three alternative approaches are outlined and compared in terms of their relative efficiency. In that decisions are being made and resources are being allocated in an increasingly uncertain world, scenarios offer the decision maker a context within which to evaluate proposals. 5 Tables. (SOCIOL AB

Sarin, R.K. A sequential approach to cross-impact analysis. Futures (UK), 1978, 1(1), 53-62.

A knowledge of the likelihoods of future scenarios is needed for planning in industry and government. The approach in this presentation employs the knowledge and the experience of "experts" in the form of subjective probabilities to determine the likelihood of events. The necessary and sufficient conditions that the elicited information from the experts must satisfy in order to compute the likelihood of the scenarios consistently are derived. A sequential procedure is developed that utilizes this information in generating the probabilities of the scenarios. Approximation schemes and sensitivity analysis are recommended to implement the approach with less time, effort, and cost. This procedure has several advantages over a direct-assessment approach. Tables. Equations. References. (INFO)

Welch, H. Jr., & Watson, S.E. Techniques of future research. New Directions for Student Services, 1979, 1(6), 1-16.

Faced with the challenges of a dynamic future, the concerned student affairs professional should be aware of some of the more promising methodologies for future forecasting. The future-responsive administrator may wish to incorporate these tools into a pro-active approach to student services. (ERIC)

Werbos, P.J., & Titus, J. An empirical test of new forecasting methods derived from a theory of intelligence: The prediction of conflict in Latin America. Transactions on Systems, Man, and Cybernetics, 1978, 8(9), 659-666.

Describes the "compromise" method, a new computer-based forecasting tool that, like regression (least squares) or new forms of Box-Jenkins methods, estimates the parameters of a multivariate dynamic model and may be used for causal analysis or policy impact analysis. (PSYCH AB)

Zentner, R. War games for the board room. Planning Review, 1980, 8(1), 25-30.

One of the main objectives of a planning scenario is to provide decision-making alternatives, while a second objective is to impress upon the user the uncertainty of the future. Businesses began using scenarios in the development of corporate plans, some of which are public. Development of a scenario begins with variable selection and the setting of premises; the scenario writer then must make a distinction between trends and events which are to affect the scenario. Two main methods for developing scenarios are available: (1) hard methods, involving mathematics, models and computers, and (2) soft methods, which are intuitive, more qualitative, and involve individual and personal choices. A typical hard method is cross-impact analysis, which offers an orderly examination of interaction between several events, using a matrix method to systematically examine combinations. The computer model must be used with caution. There are many intuitive scenario methods, one of the most basic being expert opinion. Hard and soft methods are essentially complementary. Charts. (INFO)

FUTURES STUDIES: EDUCATION

Allain, V.A. Futuristics and education. Bloomington: Phi Delta Kappa Educational Foundation, 1979. (ERIC Document Reproduction Service No. ED 178 398)

Educators can help people adjust to rapid and continual social change by borrowing techniques developed in the field of futuristics. Specifically, educators can encourage people to think about and react to projected changes. Futuristics (the field of study concerned with systematic study of the future using a wide range of disciplines) is based on the assumption that decisions made now will shape the future. Aspects of futures research that differ significantly from other types of research include that futures planning is action oriented, designed to suggest multiple alternative courses of action, dedicated to anticipating and planning genuinely different concepts of the future, heavily dependent on the rational study of anticipated developments and their consequences, and concerned with creating a probabilistic environment. In addition, the concept of alternative rather than inevitable futures is fundamental to futuristics. Futurists attempt to determine possible alternative futures by considering factors such as history, chance, policy decisions, scenarios of the future, and projections based on group as well as individual opinions. Educators can incorporate futuristics into the curriculum in a variety of ways, including career awareness activities with a future orientation (elementary school), review of utopian literature and library research (secondary school), and interdisciplinary courses on the future stressing forecasting techniques, public policy, technology and educational futuristics (college level). (ERIC)

van Avery, D. et al. Futuristics and education: An ASCD Task Force report (Professional Paper, 1979-1). Alexandria: ASCD, 1979.

Educational needs for the future are discussed, particularly in light of how members of the Association for Supervision and Curriculum Development (ASCD) can help students prepare for the future. The document is presented in six chapters. Chapter I presents an overview of ASCD's long range school and educational plans. Chapter II defines key concepts in the field of future studies including alternatives, purposeful action, holism, extended time frames, interdependence, and perceptions of the universe by individuals. World problems examined in light of these concepts include ecological collapse, rising world population, scarcity of fuel and fresh water, and increasing oil prices. Chapter III focuses on educational implications of alternative futures. Topics discussed include identifying high priority issues, redefining knowledge, refocusing curriculum and objectives, and helping create preferable futures. Chapter IV explains how ASCD members can facilitate a futures orientation for students by joining the World Future Society, reading about the future, and participating in futures studies workshops. Chapter V considers how ASCD members can facilitate collaboration in the area of future studies with businesses, industries, schools, and social agencies. The final chapter offers a brief summary of the report. The document concludes with a directory of individuals and organizations involved in the futurist movement. (ERIC)

Botkin, J.W., Elmandjara, M., & Malitza, M. No limits to learning: Bridging the human gap (a report to the Club of Rome). Elmsford: Pergamon Press, 1979.

This latest report to the Club of Rome emphasizes that the human being with his/her largely untapped potential for learning lies at the center of any solution of the current world "problematique". It advocates innovative-anticipatory-participatory learning as opposed to the almost exclusively preferred "maintenance-learning" which primarily reacts to already existing crises. The bridging of the "human gap", i.e., the difference between growing complexity and problems today and our capacity to cope with it, must be furthered by all means to advance both survival and human dignity.

Bowman, J., Kierstead, F., Dede, C., & Pulliam, J. The far side of the future: Social problems and educational reconstruction. Washington, D.C.: The World Future Society, 1979.

A forceful, innovative proposal for the reconstruction of society through education. The authors outline a comprehensive model for transcending traditional education and emphasize the evolutionary changes that will help facilitate living and learning alternatives. (WFS)

Bright, R. A brief introduction to technology forecasting concepts and exercises. Austin, Texas: The Pemaquid Press, 1972.

James Bright is Professor of Technology Management at the University of Texas's Graduate School of Business Administration and President of the Industrial Management Center in Hilton Head, South Carolina. Since 1967 he has organized a series of seminars on technology forecasting and assessment. An integral part of Bright's seminars is the workshop in which students execute exercises based on case histories. Some of the most useful exercises are reproduced in this volume. Each group of exercises is preceded by a brief explanation of how forecasting techniques should be applied to the exercise, and in the process Bright offers some very clear explanations of the forecasting techniques now in use. (WFS)

Carey, M.L. Revised occupational projections to 1985. Monthly Labor Review, 1976, 99(11), 10-22.

A detailed description of revised occupational projections to 1985 is presented. Most long term trends in the employment of white collar, blue collar, and service workers and farm workers are expected to continue through the mid-1980's, but important changes will occur in the mix. As total employment grows by 20 percent, the number of jobs for white collar and service workers is projected to rise 28 percent. Blue collar jobs will increase by 13 percent. Technological changes will cause employment to increase in some occupations, with the computer industry being an excellent example. Health field occupations will grow, while the education field will grow more slowly and railroad jobs will decline. Forecasts indicate a potential supply greater than potential demand for college graduates. Jobs calling for workers with less than a high school education will be scarcer. Graphs. Tables. Footnotes. (INFO)

Danielsen, A.L. Subjective expected rates of return to education. Mississippi Valley Journal of Business and Economics, 1972, 7(3), p. 11.

The economics of education can be classified into at least 4 distinct categories or approaches. (1) rate of return; (2) human capital stock; (3) forecasting manpower; and (4) financial resources for education. The rate-of-return, or R approach is by far the most highly developed from a theoretical point of view, and the decision criteria are clear. Nevertheless, one important subrealm of the R approach has been neglected. The purpose of this paper is to distinguish actually attained from subjectively estimated rates of return to schooling and to present empirical estimates of the latter based on a sample of 129 college students. (INFO)

Eide, K. Symposium on future programmes of information and communication in educational policy and planning: Synthesis report. Paris: UNESCO, 1978.

Educational researchers, planners, and policy makers from both developed and developing nations met to present papers on and discuss the topics of information and communication in educational policy and planning. This symposium report, one of a series of UNESCO reports, summarizes their papers and discussions. There are four main topics. The first topic is the problems encountered by the educational policy-makers and planners in obtaining and utilizing information. Most countries have a need for wider participation in educational decision making. Conventional forms of international dissemination of educational information are not meeting this need for they tend to reach only a small elite at the national level. A second topic discussed was ways and means to select and disseminate relevant information. Participants from Japan, the Soviet Union, and the Netherlands described their educational information systems. By contrast, another participant talked about the difficulties of an African country such as Ghana in obtaining valid information about conditions relevant to education. The third topic discussed was the international exchange of information. One idea that was appealing to several participants was that of regional networks. The last topic discussed by the symposium is Unesco's role in the diffusion and utilization of relevant information. Training of personnel was one recommendation.

Eldredge, W.H. University education in futures studies. The Futurist, 1975, 9(2), 98-102.

The number of future-oriented courses in universities has increased substantially, a Dartmouth sociologist finds in a worldwide survey, but many academics are disavowing the futurist label. The most recent survey yields conclusions that include the following - future studies courses have grown steadily. The most significant developments in future studies appear under other names. Some 80 policy studies and 40 peace studies programs appear in college catalogs. Methodological developments in forecasting, systems theory and analysis, modeling, and gaming are used to probe the future and have seemingly been more productive than those labeled futurism. European universities generally have not welcomed futures studies as teachable material. Future studies have a poor intellectual image. Perhaps futurists and their publicists have promised more than they can deliver. (INFO)

Enzer, S. Beyond bounded solutions. Educational Research Quarterly, 1977, 1(4), 22-33.

Futures research offers new tools for forecasting and for designing alternative intervention strategies. Interactive cross-impact modeling is presented as a useful method for identifying future events. (ERIC)

Good, M.L. The scientific world in the '80s. Public Relations Journal, 1979, 35(1), 22-28.

Regardless of the education of the population, many recognize that problems in the U.S. are quite complicated and that their solution cannot be ascertained easily. The U.S. has begun to realize that such difficult questions as environmental control and industrial production must extend into the 1980s and will have a profound effect on academic and scientific establishments in this country.

During the 1980s, college enrollment is expected to decrease due to the lower birth rate of the 1960s, which means that institutions must continue present programs and create new ones under static budget conditions. Research programs will be centered around short-term, relevant research rather than long-range projects. Opportunities for bright, creative students will lessen which will deprive the U.S. of the creative leaders that are needed. The 1980s will probably require a return to basic concepts in order to produce another enlightened age. (INFO)

Hencley, S.P., & Yates, J.R. (Eds.). Futurism in education: Methodologies. Berkeley: McCutchan, 1974.

This book is an expression of the trend toward a more systematic study of the future of education and its environments. It originated in the federally supported General Special Education Administration Consortium (GSEAC) under the sponsorship of the University Council for Educational Administration (UCEA).

The book concentrates on the methods for studying educational futures. The 14 methods and related topics were chosen from more than 100 approaches to futures research and are judged to have significance not only for the study of the future but also, and particularly, for the attainment of desirable adaptations in educational institutions.

The methods described are varied and wide ranging. Some are quantitative while others are qualitative; some have already been employed in education while others have not; some enable researchers to exercise intuitive thinking while others are constrained by rigorously defined methods. There is an underlying assumption that only multiple sets of complementary techniques, rather than a single one, can make useful forecasts.

Specifically, the articles discuss contextual mapping, force analysis, relevance trees, the Delphi technique, cross impact matrices, a planning guide called Ariole, scenarios, decision matrix techniques, morphological analysis, technology assessment in education, educational trend analysis, Bayesian statistics, the Markov Chain theory and technological forecasting, and the Monte Carlo techniques in forecasting. A number of appendices on statistical procedures related to the various methods as well as a glossary supplement the overview.

Jantsch, E. Education for design. Futures, 1972, 4 (September), 232-255.

The notion of design adopted in this paper embraces the design of all human systems. The design tasks envisaged focus on processes rather than structures. They are viewed in the light of multi-level and multi-goal systems representation based on total human experience and aiming at coordination rather than control from the top. Education for design should focus primarily on the design of human relations, instrumentalities and institutions, along with their respective role patterns. The nature of learning at these three steps is seen as the cybernetic evolution of measure, norms and values respectively. (AUTHOR)

Kyle, R.M., et al. New challenges, new needs, new images: America in transition. Washington, D.C.: Association of American Colleges, 1979. (ERIC document Reproduction Service No. ED 181 785)

Trends in American higher education are surveyed in this report. Focus of the first paper, "Geographics I: A Nation Transforming and Transformed," by Regina M. J. Kyle is on demographic and regional changes affecting higher education. Extensive maps and charts explore the changing nature of American perceptions of the U.S. as a nation and the ways in which this perception influences educational needs and goals. An overview of various developments and their impact on higher education is presented by Edwin J. Allen, Jr. in the second paper, "A Local Habitation and a Name: Rural, Urban, and Suburban Environments." Three major changes in population distribution are cited: loss of population in central cities, with accompanying gain in suburban and rural areas; an increase in conflicts between the suburbanite and his rural neighbor; and changes in the structure of the family. The role of government in higher education is considered in the following three articles: "The Federal Government and Higher Education: A Review of the 95th Congress," by John W. Crewson; "Future Trends in Funding for Higher Education," by Kathryn Mohrman; and "A Department of Education? Summary of Proposals and Policy Implications," by John W. Crewson. An overview of the major legal decisions affecting higher education in 1978 is presented in a paper by Frank Gerry and Edward P. Kelley, Jr., "Legal Affairs and Higher Education." The relationship between state and higher education is surveyed in papers by Richard R. Nelson on state labor legislation and Phillip J. Hellmuth et al. on "Residency for Tuition Purposes in Wisconsin" (with accompanying data from the Education Commission of the States). The Ph.D. job crisis is discussed in a paper by W. Richard Cantwell and in a reprinted article entitled, "Working Together...The American Academy of Arts and Sciences and the History of Science Society." (ERIC)

Lonsdale, R.C. Futures research, policy research, and the policy sciences. Education and Urban Society, 1975, 7(3), 246-293.

Education relates to the future in very short-term goals, while its role should be to prepare the populace, research, and policy for innovative creative solutions for projected probabilities. Futures research depends upon reducing the uncertainty of probabilities: forecasting, and especially technological forecasting, offer alternative methodological approaches projecting alternative futures from which choices can be made. Current attempts at futures research and policy research give evidence that a meld has begun with policy planning. Five proposals for futures policy research suggest: (1) large state education departments should establish offices of futures research, (2) U's should encourage establishment of commissions to draw upon futures interest among faculty and students, (3) basic methodology courses in research should include instruction in futures research, (4) doctoral students should be encouraged to do studies involving futures research methods, and (5) U. administrative training programs should encourage exploration of futures research. In COMMENTS ON THE LONSDALE PAPERS, Thomas S. Popkewitz and Howard E. Wakefield (U of Wisconsin, Madison) express interest in and reservations on futures policy. Popkewitz sees conceptual problems involved in defining futurism, the moral and political dimensions of futures research planning, and the optimism of futurism. Educators do not impact methodology only; values are inherent in futuristic concerns and self-fulfilling prophecies must be avoided. Who is to decide the ultimate concern of futurism's research -- does this imply an expert elite? A clear case for the role of education in futurism is not presented. Wakefield wonders which of the available methods would best lend itself to futuristic research and asks for comments regarding and lack of interest by school district officials regarding futures planning. Lonesdale replies that futures research does involve values, but that identifying value shifts should be an important function of knowledge gathering. Futurist researchers should project the probabilities based on values inherent to each, clarifying value direction connected with choices. There is a need for a recorded history of futurism so that predictions can be validated against fact. Futurists should be allowed to project, predict, and forecast based upon proposed creative solutions. But their predictions should be rigorously challenged to elicit the best possible alternative for future directions. (SOCIOL AB)

Madgic, R. Using futures research approaches to aid educational decision-making. Thrust for Education Leadership, 1976, 5(4), 27-28.

By applying futures research approaches educators are able to reject demands and/or claims based upon simplistic visions. They can, therefore, make more realistic curriculum revisions in planning communication skills programs that will benefit students in the future. (ERIC)

Maier, H. Long-term planning and forecasting for education in the German Democratic Republic. In T.S. Khachaturov (Ed.), Methods of long-term planning and forecasting (Proceedings of a conference held by the International Economic Association at Moscow). London: The Macmillan Press, 1976.

This article describes a number of planning models, examining them in terms of their usefulness for interrelating the socio-economic, scientific-technical, and pedagogical evidence as well as their relevance for long-term decision-making processes in a socialist-society. The author develops a model which allows him to estimate the course of manpower demand over a certain period of time, given changing numbers of skilled workers and graduates from universities and higher technical schools, and in turn, to illustrate that changes in these numbers affect the total capacity and the pattern of training in the educational system of the G.D.R. A model of "difference equations" is used.

Masini, E.B. Experience of education towards the future. Convergence, 1975, 8(3), 77-84.

The author analyzes the experience of education towards the future as it is formalized in courses for post-graduate study at the school of future studies, Rome; as it is seen by young people, undergraduates, and high school students; and as a continuous transformation, acquiring characteristics of lifelong education. (ERIC)

Maxmen, J.S. Forecasting and medical education. Journal of Medical Education, 1975, 50(1), 54-65.

Describes modern forecasting techniques and criteria to evaluate prognostic endeavors, including intuitive forecasting, consensus methods, cross-impact matrix methods, and trend extrapolation. Examples of how these "futures research" techniques can be applied to medical education are provided. (PSYCH AB)

McCormick, K. The political context of manpower forecasting in Britain. British Journal of Industrial Relations, 1977, 15(3), 403-413.

The most significant development affecting the potential uses of manpower forecasting in educational planning has been the emergence of the department of employment as a strategically important ministry. The responsibilities of this department for the full range of utilization will be given more serious attention and that manpower forecasting will not be used to concentrate political attention on the educational system. The neglect of the possibilities of direct action on the stock of qualified manpower in industry in favor of concentration on the new supply from the educational system represented a usurpation of political responsibilities and an attempt to place the burdens of change on the educational system. There is some hope that a department with a wider brief for manpower issues will avoid that pitfall. References. (INFO)

McNamara, J.F. Trend impact analysis and scenario writing: An application in an urban school district staff development program. Planning and Changing, 1975, 6(1), 17-27.

Outlines a field-based project that shows how an urban school district can use futures research models to approach long-range planning. (ERIC)

Moore, L.F., & Charach, L. Planning for a University: Using interactive forecasting. Long-Range Planning, 1980, 13(3), 109-114.

The benefits of programme review, forward planning and control have been demonstrated at the university-wide level. Within a faculty or department, there is also a clear need for developing and using planning methods which are rationally based and forward looking if appropriate responses to changing social and academic trends are to be made. This paper delineates a number of planning and control variables encountered at the faculty or departmental level, describes the development and use of a computer-based interactive forecasting model, and discusses the advantages and limitations of such models in planning a faculty's progress toward its goals. (AUTHOR)

Morris, G.B. An educational model for the 1980's-90's. Paper presented at the World Future Society - Education II Conference, Minneapolis, October 17-21, 1979. (ERIC Document Reproduction Service No. ED 180 884)

An educational framework for the future should be based on an understanding of the nature of future society and reflect approaches significant to harmonious survival. The framework should include the concepts of change, conscious awareness, and cooperation. Concepts of change emphasize environmental change and change in personal behavior. The development of conscious awareness requires new modes of thinking. Specifically, a form of thought defined as global or universal should be explored. Also, because cooperative survival may replace the concept of competition, educational approaches should be aimed at individual and social cooperation. This framework would not require a curriculum change, but rather a change in how the student experiences the content. Changes in school programs may include greater emphases on physical education, personal development, human relations, self-reliance, relaxation, religion, and recreation. Finally, decision making and problem solving by educational leaders will involve cognitive, affective, and spiritual domains.

O'Brien, P.W. Futures research in education. Australian Journal of Education, 1976, 20(1), 46-58.

Outlines the growth of futures research and the role accorded to it in Europe, North America and elsewhere, particularly with reference to work being carried out in the United States. (ERIC)

Organization for Economic Co-operation and Development. Future educational policies in the changing social and economic context. Report of the Meeting of the OECD Education Committee at Ministerial Level. Washington, D.C.: OECD Publications and Information Center, 1979.

Discussion at the OECD Education Committee meeting focused on education policies of OECD nations in the context of social and economic trends, the contribution of education to preparation for working life, and the transition from school to employment. The report is presented in two major sections. Section I outlines the educational policy debate. Statements by the Secretary-General of the OECD and by the Minister of Education and Science of the Netherlands focused on the need for educational re-assessment and innovations, educational objectives, individual and social needs with regard to education, governmental responsibilities to provide education, teacher training, the role of education in the emancipation of women, and political motivations of various social groups seeking specific types of education. Following these statements are outlines of themes discussed by the ministers and a declaration of educational policy priorities. These include taking a long-term view with regard to educational issues, increasing educational cooperation between nations, and increasing access to education. Section II contains a report prepared by the OECD Secretariat to provide background information to the meeting participants on educational policy trends. Topics discussed include demographic trends, enrollment trends, teacher supply and demand, trends in educational expenditure, and interrelationships between education and employment. (ERIC)

Shane, H.G. Curriculum change toward the 21st century. Washington, D.C.: National Education Association, 1977.

In his latest book, Shane examines the responses of an international panel of educators and other leaders to questions regarding the content and direction of education in the years to come. The report concludes by proposing 28 cardinal premises to guide curriculum development for the future. (WFS)

Shane, H.G. Social decision prerequisite to educational change, 1975-1985. In G.E.W. Wolstenholme, & M. O'Connor (Eds.), The future as an academic discipline, (Ciba Foundation Symposium 36). New York: Elsevier, 1975.

This article takes the position that the schools have not performed, and in all probability never can perform, any yeasty leadership function in social change.

If, like a highly polished speculum, schools can merely reflect the society in which they have their being, then certain social decisions are prerequisite to any new basic educational change. The success with which social change occurs depends on the image or images of the future which a given human sub-set accepts and the way this group chooses to approach the future.

Points developed include: (1) some premises which may be helpful in contemplating the future, (2) probable developments of the next decade which are likely to have a bearing on cultural change, and (3) a roster of important decisions which must be made if schools are to have clear guidelines as they seek to serve the society that supports them.

The paper concludes with speculations on the probable nature of educationally portentous decisions that are emerging, and with a timetable for educational change between 1975 and 1985. (AUTHOR)

Shane, H.G. The educational significance of the future. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1973.

The author, a professor of education at Indiana University, prepared this report for the U.S. Commissioner of Education on the basis of interviews with more than 80 futurists. The book offers a compact digest of what futurists are thinking about the future and specifically about education. (C)

Steele, J.L. Operational research and formal education. Journal of the Operational Research Society, 1979, 30(3), 201-211.

The development of operational research (OR) in the U.S. educational system is related to certain political and social developments which have enhanced the significance of matriculation. The impact of these developments on the traditional educational delivery system has stimulated administrators to seek outside help. These developmental factors include: (1) increasing population, (2) advancing technology, (3) curricula support, and (4) the equal rights movement. School management generally needs 3 levels of information: (1) forecasting, (2) management control, and (3) operational control. Several varieties of quantitative models for educational information analysis have been developed for different purposes. These models include: (1) simulation and cost models, (2) general deterministic models, and (3) specific deterministic models. Meaningful applications of OR in future education depend on the development of goal programming models. References. Equations. (INFO)

Toffler, A. (Ed.). Learning for tomorrow: The role of the future in education. New York: Random House, 1974.

This anthology is essentially a call for "education in the future tense." The central thesis is that all education springs from images of the future, and all education creates images of the future. The volume includes a "Status Report, Sample Syllabi, and Director of Future Studies" by Billy Rojas and H. Wentworth Eldredge. (WFS)

Wasdyke, R.G. Career education and the future. Washington, D.C.: National Advisory Council for Career Education, 1975. (ERIC Document Reproduction Service No. ED 122 007)

The report presents emerging trends, future outlook, and potential legislative provisions for career education. Two basic assumptions by the year 2000 are the recognition of education as a lifelong process with open entry/exit and the disappearance of traditional distinctions between learning in a formal setting and learning in the work place. The future will bring coequal collaboration and linkage between education and work sectors, emphasis on individual needs through career education, individualized learning through competency-based assessment, increased opportunities for education and training, expansion of counseling/guidance/placement/information systems of career development, the concept of entitlement or an "educational savings account," loosening of organizational constraints, and the emergence of a national education-work policy. Five basic provisions for comprehensive career education are identified: (1) leadership development (inservice training for teachers, counselors, and coordinators), (2) program grants to states, (3) state planning and evaluation grants, (4) continued authorization of a national advisory council on career education, and (5) an expanded federal office of career education. Procedural steps are discussed, and estimated costs are presented. A paper, "Futures Research in Education," and a bibliography are appended. (ERIC)

Walz, G.R., & Leu, J. Educational futures: A survey of futuristic issues and expectations. Ann Arbor: ERIC Clearinghouse on Counseling and Personnel Services, 1979.

The ERIC Futures Issues Component (EFIC) of the ERIC Clearinghouse on Counseling and Personnel Services (ERIC/CAPS) created a survey with each of the 16 ERIC Clearinghouses and the University of Michigan School of Education to identify emerging social issues and developments with potential for significantly affecting education. Respondents (N=79) to the 55-item survey were Clearinghouse staff members, Advisory Board members, and users of the ERIC System. Results suggested that among the ten items most often nominated as priorities for action, most deal with services and/or responses to special population groups such as women, adults, and minorities. Equal access to education and expanded opportunities for life-long and continuing education for all individuals were also rated high in action priority. The appendices contain the Futures Survey instrument, the means and standard deviations of responses to Part III items in the survey, data from all issues in Part IV of the survey, and a summary of data from the total sample concerning issues selected most or least often for educational involvement. (ERIC)

Weiler, H.N. New directions in educational planning: Implications for training (IIEP Seminar Paper: 36). Paris: UNESCO, IIEP, 1977.

This paper identifies the directions in which new developments in educational planning are moving and draws some conclusions on how the training of specialists in the field of educational planning is likely to be affected by changing notions and practices. The first part of the paper outlines the assumptions that have characterized the field in recent years. These assumptions are concerned with planning as social research; the distribution of education; the quantity, quality, and content of educational planning; educational planning at national levels; and what lies beyond the design of educational plans. Against this background, the second section briefly reviews how the changes discussed are likely to affect the role and the competencies required of the people who will be in charge of planning and the relationship of these changes to the training of planners. The areas discussed are the research component in training; distribution, disparities, and equality in education; the determinants of educational outcomes; regional and local planning; and the implementation and evaluation of educational plans. (ERIC)

von Weizacker, C.C. Long-term global optimisation in educational planning. In T.S. Khachaturov (Ed.). Methods of long-term planning and forecasting. (Proceedings of a conference held by the International Economic Association at Moscow). London: The Macmillan Press, 1976.

Many educational planning models restrict themselves to easily measurable variables. The author of this article develops a method which takes into account variables and parameters which are difficult to measure but important. This approach involves essentially the use of optimisation techniques for educational planning. In particular, it can be used to obtain approximate data for variables measuring the global benefit of activities such as education, health, services, traffic and others.

Young, W.E. Determination of educational policy by futures research methods. Saskatchewan, Canada, 1978. (ERIC Document Reproduction Service No. ED 161 139)

Futures research can help human beings have a better knowledge of things to come, determine needs, and set priorities for achieving goals. This paper surveys futures research methods, concentrating on the Delphi Method of forecasting goals. The case study used to illustrate the Delphi Method is a comparison of hierarchical, homogeneous, and heterogeneous panels of experts in specialist and generalist sections who determined priorities for a program in family studies. A questionnaire, evaluated by a 15-member advisory committee, was completed by 104 persons in six Delphi panels. The response to the three-round study was 89.4 percent, 82.7 percent, and 89.4 percent. The Delphi Method was found suitable to develop objectives, course groupings, and content topics for a program in family studies. There were sufficient differences in the panels to warrant continued research into the characteristics of groups used to determine policy. (ERIC)

POLICY PLANNING AND ANALYSIS

Ascher, W. Forecasting: An appraisal for policy makers and planners. Baltimore: The Johns Hopkins University Press, 1978.

This book appraises the performance of professional forecasts in the past and today. After a comprehensive introduction about the essence of forecasting, the author analyses the reasons for having forecasts and their impact on policy making. The influence of available forecasting methods on the practices of the public decision process receives special attention. The core of Ascher's work is presented in five chapters, one each on population, economics, energy, transportation, and technology forecasting. In each chapter forecasts are analysed for their accuracy and the reasons for their lack of it. The dominant finding is that assumptions are more important than methodology.

Clark, T.N. Community social indicators: From analytical models to policy applications. Urban Affairs Quarterly, 1973, 9, 3-36.

Two types of social indicators are distinguished: descriptive and analytical. The essential characteristic of analytic indicators is that they are integrated into models and are, therefore, useful for understanding patterns of association and change. Both types of indicator can be evaluated in terms of three criteria: (1) measureability, (2) social importance and shared goals, and (3) policy importance. At the community level, these criteria are used to suggest a more intensive focus on (1) policy outputs, the products of collective decisions, in terms of (a) fiscal and (b) performance indicators and (2) policy impacts, the changes brought about in a society as a consequence of policy outputs. Problems that may be encountered in measuring policy outputs and impacts are discussed. A model is derived to explain variations in common expenditures of municipalities (policy outputs) based on data from 51 cities. The author suggests that the model serve as a "core model" to which specific variables might be added if policy changes concerning them are being considered. It is noted that policy impacts are less well understood than policy outputs. A methodology is presented for assessing attitudes toward public policies that may help in evaluating these impacts. (G)

Cook, T.J., & Sciolo, P. Jr. A research strategy for analyzing public policy. Administrative Science Quarterly, 1972, 17(3), 328-339.

A neglected aspect of policy research has been the systematic analysis of policy impacts. This paper presents a res. strategy for measuring policy impacts based upon the principles of exp'al design methodology. The strategy is illustrated through the application of a multivariate factorial design to the area of air pollution control. The overall approach is discussed in terms of its general utility for policy impact analysis. (SOCIOL AB)

Galnoor, I. Social indicators for social planning: The case of Israel. Social Indicators Research, 1974, 1, 27-57.

The author views social planning as an organizing framework for guiding government intervention in social life and social indicators as providing the informational basis for formulating policies, preparing social plans and evaluating the impact of government activities. Social planning and social indicators are only two links in a desired sequence of organized social action, but given the urgency of social problems and the opportunity cost of waiting for further theoretical development, the author urges that initial efforts be directed at developing social indicators for social planning. Israel's experience is presented as an example of (1) the ideological and operational background of specific types of intervention by the state and (2) specific areas that have been neglected, or that have not been given adequate attention, because of the lack of social indicators to assist in acquiring an overall understanding of societal changes. These examples are used as a basis for suggesting some practical possibilities for developing social indicators and social planning in Israel and elsewhere. The author lists several implications of his study of the Israeli situation. (1) Social indicators cannot be value-free. (2) National societies, especially in new nations, emphasize the importance of creating and preserving the national framework, often at the cost of internal social development. (3) Narrowly defined economic objectives cannot be assumed to be a "stage" of social development. (4) Sectoral planning in the areas of agriculture, transportation, education, and in other areas related to societal well-being tends also to use an economic and physical information basis. (5) The threshold leading to the industrial and postindustrial era poses some difficult choices for many countries. (6) The detection of societal changes cannot be achieved without a system of social mapping, based on the collection and utilization of social indicators. (7) Policymaking in many countries utilizes various kinds of information on foreign relations, security, economic development, and public opinion. (8) Social reports by an independent organization or by the central government can help in crystallizing this information for purposes of reviewing social changes, pointing out desired directions of social development, and evaluating policy achievements. (9) Government departments and public organizations can use social information for planning and evaluating the social benefits of their activities. (10) The multiplicity of sources of social indicators within any society should be regarded as a safety valve against the totalitarian implications of collecting and using social indicators for social planning. (11) Social indicators and social reports do not guarantee improved social policy and planning. (G)

Gray, P. University planning models: A survey and a bibliography (Exchange Bibliography No. 1279). Monticello, Ill.: Council of Planning Librarians, 1977.

Increasing use has been made in recent years of the techniques and ideas of management science and operations research in the management of universities and colleges. The various types of models being applied are described briefly and three specific evaluated. The bibliography is keyed to the various areas of research and implementation. (AUTHOR)

Hahn, W.A., & Gordon, K.F. (Eds.). Assessing the future and policy planning. New York: Gordon and Breach, 1973.

This volume consists of papers presented at a conference organized by the Washington, D.C., chapter of the Institute of Management Sciences, the World Future Society, and the National Bureau of Standards in Gaithersburg, Maryland, in March 1970. The contents include papers by Joseph P. Martino on "Methods of Technological Forecasting," Jack W. Carlson on "Impact of Future Forecasts on Federal Policy," and Charles W. Williams, Jr., on "The Role of National Goals Research." (WFS)

Moyer, K.L. Evaluative research systems for educational policy. Paper presented at the Annual Meeting of the Concerned Leaders in Educational Administration and Research, Alexandria, November 6, 1978. (ERIC Document reproduction Service No. ED 179 554)

Four evaluation methods for determining educational policy are objectivism; subjectivism; emotive-imperative; and instrumentalism. For the objectivist, the rationale for undertaking an evaluation is based on empirical verification or non-verification of claims of existing policies or activities. Secondly, the objectivist is interested in questioning what should exist in education. Objectivists may be disinterested in the agency or policy making decisions, and are mainly concerned with precision, methodological accuracy, and the reliability of the evidence. The subjectivist is interested in the affective domain of feelings, attitudes, and interests, and many use the questionnaire as a methodological tool. The subjectivist is concerned with the value of educational products in terms of approval or interest. For emotive-imperative theorists, in contrast to the subjectivists, praise or condemnation of programs is based on individual feelings, and emotive evaluation is used to change attitudes of policy makers. Although data collection is involved, results are presented as expressions of feelings. Instrumentalists are involved in influencing decisions which resolve problems practically. Instrumental evaluations are related to specific programs. These evaluations are associated with operations performed during the implementation of programs or policies. Educational policy is considered secondary to educational practice.

University of Southern California, Center for Futures Research. The twenty year forecast: Prospectus 1974. Los Angeles: Author, 1974. (ERIC Document Reproduction Service No. ED 091 291)

An outline of a major project of research and analysis to be undertaken by a graduate school of business administration is described as a continuing series of studies designed to provide a unique data base for planners in the private and public sectors. The data base would be derived from the intersection of significant social, economic, and technological trends and other probable future occurrences. The forecasts would draw on techniques and methods that are being developed for more accurate social and corporate planning, tracing the probable future consequences of current policies and practices, and exploring the potential of alternative courses. The background of fundamental issues that will require resolution in the next decades is presented; the objectives and principles of the pilot study to be conducted are noted; and program priorities--energy and social change, new organizations and institutions, social contracts, and manpower problems--are enumerated. The intended sequence of program processes is discussed and a budget proposed. (ERIC)

Wilson, D.E. The national planning idea in U.S. public policy. Boulder: Westview Press, 1980.

This book offers and analyzes a variety of past and current examples of national planning efforts and ideas. In addition, it discusses various theoretical approaches to planning as well as the future of American national planning. The author supplements his discussion with a number of tables and an extensive bibliography.